

Upper San Joaquin River Region

Regional Flood Atlas–Draft

REGIONAL FLOOD
MANAGEMENT PLANNING



May 2013



PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY



Regional Flood Management Planning

The California Department of Water Resources (DWR) has launched the Regional Flood Management Planning effort to work with local entities to collect on-the-ground information and to use existing technical studies to formulate feasible projects, assess the performance of the projects, and develop a plan that reflects the vision of local entities in reducing flood risks in their region. DWR plans to provide guidance, as well as technical and financial assistance, to local agencies to prepare regional flood management plans that formulate and prioritize the proposed projects in each region. Regional Flood Management Planning is an important first step in refining and implementing the 2012 Central Valley Flood Protection Plan.

Though the 2012 CVFPP identifies nine regions (Upper Sacramento, Mid-Sacramento, Feather River, Lower Sacramento, Delta-North, Delta-South, Lower San Joaquin, Mid-San Joaquin, and Upper San Joaquin), the majority of the regions have partnered together, resulting in six regions. These six regions are the Upper/Mid-Sacramento River, Feather River, Lower Sacramento River/Delta North, Lower San Joaquin River/Delta South, Mid-San Joaquin River, and Upper San Joaquin River.

Each of the six planning regions has formed a working group that is led by a local agency and consists of representatives from flood management agencies, land use agencies, flood emergency responders, permitting agencies, and environmental and agricultural interests. The regional plans will present local agencies’ perspectives of flood management with a prioritized list of projects that need to be implemented to reduce flood risks in each region. Each plan will also present an assessment of the proposed project costs and benefits, considering potential contributions to an integrated and basin-wide solution.

Regional Flood Atlas

During the development of the 2012 Central Valley Flood Protection Plan (CVFPP) the areas protected by the facilities of the State Plan of Flood Control (SPFC) were organized into flood planning regions to account for the variations in land use conditions, flood protection facilities, and flood hazards. Through the regional planning process, FloodSAFE will work with local partners to identify and prioritize proposed regional flood system improvements for each of the six flood planning regions.

This Regional Flood Atlas is primarily graphic depictions of the flood risk characteristics and hazards of the region. The Regional Flood Atlas was compiled from existing data to share understanding and to facilitate discussions about the “current state” of flood risks in the region. The Regional Flood Atlas is a compilation of several ongoing efforts within DWR. The information in the Regional Flood Atlases is a snapshot of those on-going efforts. The Atlas is not intended to serve as a comprehensive environmental setting section under CEQA or NEPA.

During the course of the regional planning effort, additional regional information will be gathered from local agencies to more fully identify the regional flood risk. New information obtained through these meetings and workshops will be used to update the Regional Flood Atlases. When complete, the Final Regional Flood Atlases will be appended to the Draft and Final Regional Plans.

The Upper San Joaquin River Region includes areas protected by SPFC levees (project levees) primarily adjacent to the San Joaquin River upstream of the confluence with the Merced River. This region’s land use is primarily rural except for the urban areas which include the cities of Merced, Dos Palos, and Firebaugh.

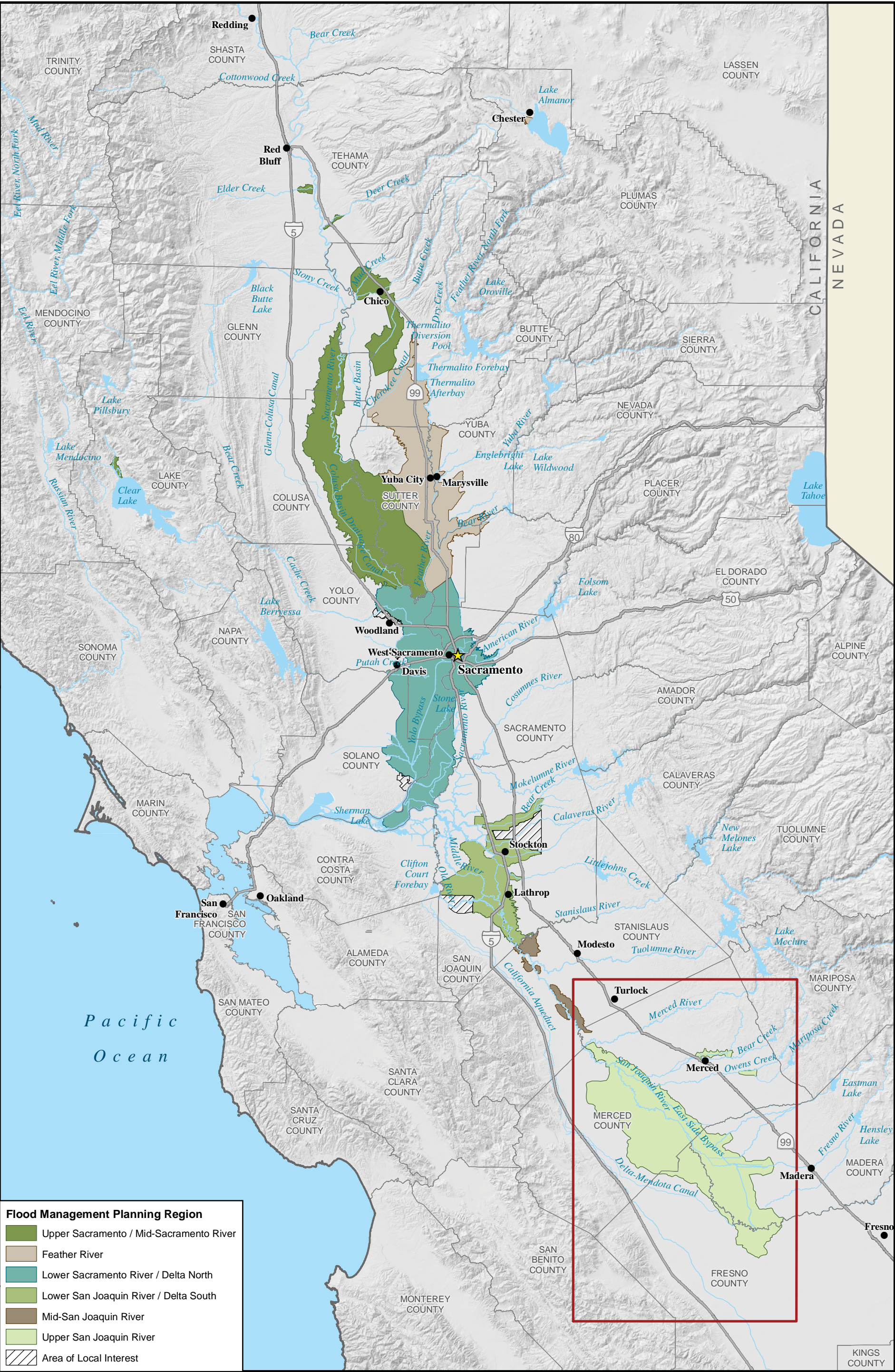


San Joaquin River levee breach near Mendota, 1997

The following list of maps has been identified for inclusion in the Upper San Joaquin River Regional Flood Atlas:

- Map 1 Regional Overview – This map identifies the boundaries and map extent for the Region.
- Map 2 Protected Populations and Assets – This map identifies the distribution of protected populations and assets in the Central Valley.
- Map 3 Levee Flood Protection Zones –This map shows areas within the Region protected by the facilities of the SPFC.
- Map 4 Local Jurisdictions – This map shows the city and county boundaries and will be used to identify the local land use planning authority in order to identify the appropriate land use-based roles and responsibilities.
- Map 5 DWR Integrated Regional Water Management Planning Areas – This map identifies the DWR Integrated Regional Water Management Planning Regions that coincide with the Flood Planning Region.
- Map 6 General Land Use – This map identifies general land uses, including agricultural, urban and native vegetation. This information will be used to identify flood risks of current and future development in the floodplains.
- Map 7 Local Maintaining Agencies – This map identifies the LMA boundaries within the Region.
- Map 8 Existing Critical Facilities and Economic Assets – This map identifies highways, primary county roads, railroads, bridges, airports, docks/marinas, hospitals, police stations, firehouses, and schools.
- Map 9 SPFC and Local Flood Control Facilities – This map identifies the SPFC and Non-SPFC flood control facilities (levees, weirs, pump stations, canals) that provide flood protection. This information will be used to identify and locate all flood facilities in the Region.
- Map 10 Flood Emergency Response Facilities – This map identifies facilities that may be used to support emergency response readiness.
- Map 11 Overall Levee Conditions – This map includes the results of inspection reports, Non-Urban Levee Evaluations/Urban Levee Evaluations, and other known/identified deficiencies or areas of poor past performance.
- Map 12 Seepage Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced seepage issues.
- Map 13 Slope Instability Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced slope instability issues.
- Map 14 Erosion Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced erosion issues.
- Map 15 Other Past Performance Problems – This map includes the results from Flood System Repair Program/Urban Levee Evaluations, showing areas which have experienced a variety of issues including breaches and overtopping.
- Map 16 FEMA 100-Year Floodplain – This map identifies the 100-year flood inundation areas from the FEMA 100-year floodplain.
- Map 17 Channel Capacities and Flood Forecast Monitoring Network –This map identifies the current channel capacities of the SPFC. This information will be used to identify the floodways and their capacities within the region.
- Map 18 Managed Environmental Lands – This map identifies the wildlife refuge areas and critical habitat areas. This information will be used to map ecologically sensitive areas within the region.
- Map 19 Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species – This map identifies riparian vegetation along the rivers and streams affected by the SPFC facilities, and the presence of Critical Habitat or Endangered and Threatened Species within the region.

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Flood Management Planning Region

- Upper Sacramento / Mid-Sacramento River
- Feather River
- Lower Sacramento River / Delta North
- Lower San Joaquin River / Delta South
- Mid-San Joaquin River
- Upper San Joaquin River
- Area of Local Interest

1" = 20 miles

0 5 10 20 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

**Upper San Joaquin River
Regional Overview**

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map01_Overview.mxd

MAP 1

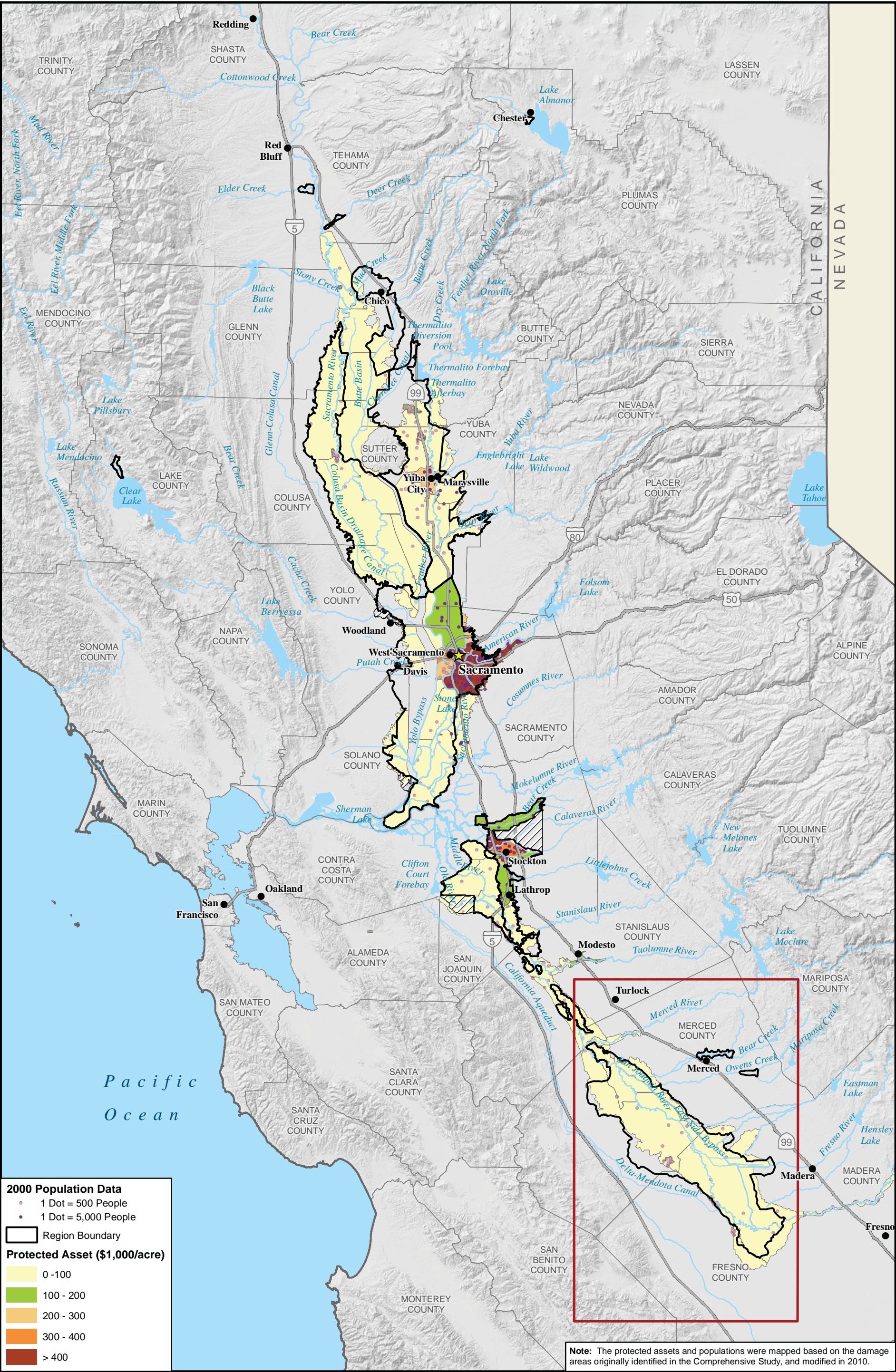
Map 2 – Protected Populations and Assets

Over the last century, the Central Valley has experienced intensive development to meet the needs of a growing population. A complex water supply and flood risk management system supports and protects a vibrant agricultural economy, several cities, and numerous small communities. The SPFC protects a population of over one million people,

major freeways, railroads, airports, water supply systems, utilities, and other infrastructure of statewide importance, including \$69 billion in assets (includes structural and content value and estimated annual crop production values). Many of the more than 500 species of native plants and wildlife found in the Central Valley rely, to some extent, on habitat existing within the SPFC.



San Joaquin River levee breach near Mendota, 1997



2000 Population Data

- 1 Dot = 500 People
- 1 Dot = 5,000 People

Protected Asset (\$1,000/acre)

- 0 - 100
- 100 - 200
- 200 - 300
- 300 - 400
- > 400

Region Boundary

1" = 20 miles

0 5 10 20 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Protected Populations and Assets

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MAP 2

Map 3 – Levee Flood Protection Zones

Each flood planning region is composed of numerous Levee Flood Protection Zones (LFPZs). Assembly Bill No. 156 (AB156) defines a Levee Flood Protection Zone as the area that receives protection from a levee that is part of the facilities of the State Plan of Flood Control. AB 156 requires the development of the maps that delineate LFPZs using the best available existing information. The LFPZ are intended to show areas protected by project levees at or below design flow, but the LFPZs are not synonymous with a level of protection and should not be construed as such. The Department of Water Resources’ Central Valley Floodplain Evaluation and Delineation Program published the initial LFPZs in December 2008.

The LFPZs are generally separated into two groups:

- LFPZ areas subject to flooding from ponding areas with depths greater than three feet. These areas are typically surrounded by levees, so the lateral extent of flooding can be identified. These areas are shown in orange on the published LFPZ maps.
- LFPZ areas subject to flooding from channel or overland flow resulting in unknown flood depths. These areas are not entirely surrounded by levees, so the LFPZ boundaries are thus approximate and should not be considered precise delineations. These areas are shown in yellow on the published LFPZ maps.

LFPZs estimate the maximum area that may be inundated if a project levee fails when the water surface elevation is at the top of a project levee. Zones depicted on this map were created utilizing methods and assumptions described in the LFPZ Map Development Technical Memorandum, and do not necessarily depict areas likely to be protected from flow events for which project levees were designed. The LFPZ Map Development Technical Memorandum was produced by DWR’s Division of Flood Management, Floodplain Risk Management Branch.

Lands within the LFPZs may be subject to flooding due to various factors, including the failure or overtopping of project or non-project levees, flows that exceed the design capacity of project or non-project levees, and flows

from water sources not specifically protected against by project levees. Lands not mapped within a LFPZ are not invulnerable to flood risk, and some may also experience flooding from these or other processes.

Flood History – Upper San Joaquin River

The following flood history was compiled from the Historical Reference Document for the State Plan of Flood Control (May 15, 2009), and information collected by the Statewide Flood Management Program. The list includes major events beginning in 1955, after substantial completion of flood control infrastructure. Specific information on localized flood information was included where available.

1955 Floods in the San Joaquin River basin completely controlled by Friant Dam.

1958 Six local levees breached on the San Joaquin River from Friant Dam to the Merced River and 250,00 acres flood from Stockton to Fresno.

1964 Breach along the Eastside Bypass in December to January 1965.

1967 Significant flooding on Madera County streams in the lower portions of the Fresno and Chowchilla rivers.

1983 Flooding throughout the entire Central Valley during the month of March with numerous levee breaks and major damage. Relatively greater damage in the San Joaquin Valley than in the Sacramento Valley. Four times the average volume passes through the entire Central Valley Flood Management System during winter and spring 1982 through 1983.

1986 Urban and small-stream flooding was widespread during the flood season.

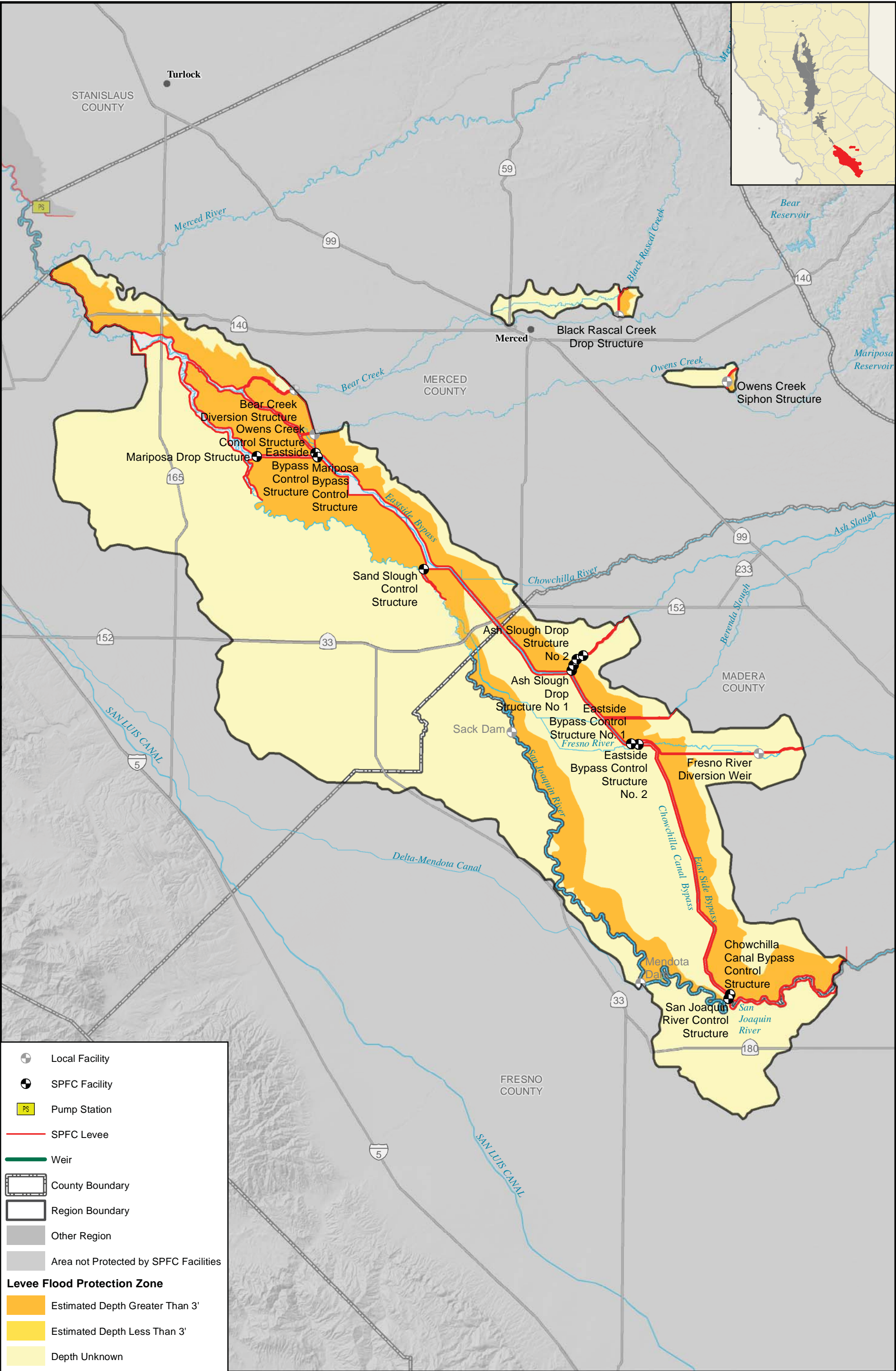
1995 Severe winter storms, flooding, landslides, mud flows. Over 100 stations recorded their greatest one-day rainfall in history.

1997 A trio of subtropical storms and snowmelt caused flooding in January.

2006 Localized flooding, landslides and mudslides.



Flooding on Black Rascal Creek near Merced



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River
Levee Flood Protection Zones

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MAP 3

Map 4 – Local Jurisdictions

The Jurisdictions Map provides the boundaries for cities, counties, and tribes located within or near the flood management planning region. These entities may provide services related to flood management planning such as: land use regulation and planning, public works engineering and maintenance, and emergency services.

The Upper San Joaquin River Region crosses three counties and four cities: Fresno County, Madera County, Merced County, City of Dos Palos, City of Firebaugh, City of Los Banos, and the City of Merced. The incorporated city and county boundaries illustrated on the map were obtained from CAL-FIRE 2010 (<http://www.fire.ca.gov>). For more details on the flood management planning boundary, please refer to Map 3 and text.

Contact information for these entities can be found in the Directory of Flood Officials published by DWR in September 2011.

Disadvantaged Communities (DAC)

DWR recognizes that disadvantaged communities (DAC) may exist within each region. DACs may be eligible for grants or additional State financial assistance for local flood control efforts. DAC status can be confirmed using the Department of Water Resources, Disadvantaged Community Mapping Tool:

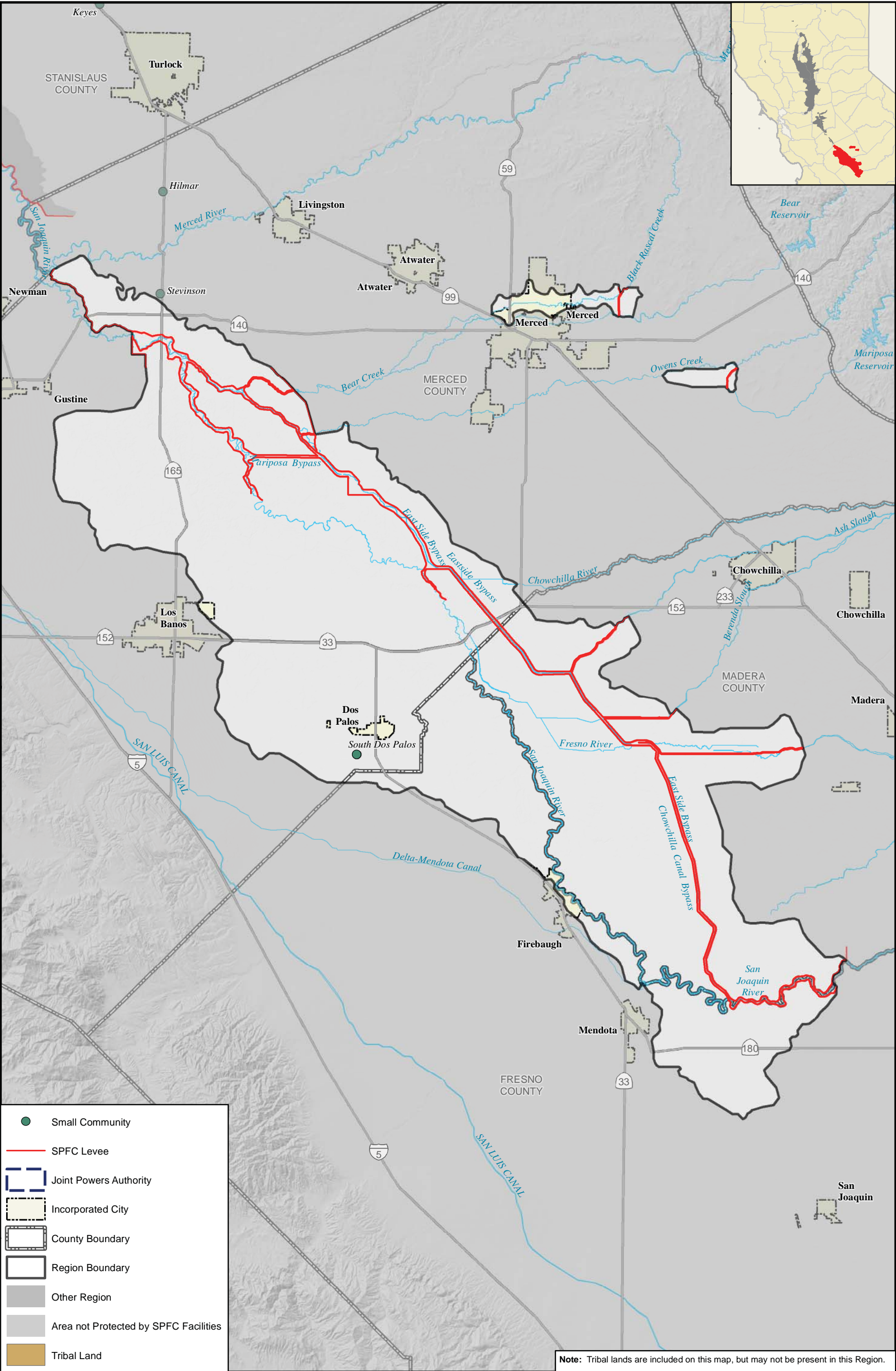
http://www.water.ca.gov/irwm/integregio_resourceslinks.cfm#DAC

Tribal Land Boundaries

The locations of Tribal Land boundaries from the Bureau of Indian Affairs (BIA) were used to determine if tribal lands exist within the Region. Very few of the identified Tribal Lands are located in or adjacent to the Flood Management Regional Areas. Where present, the Tribal names are provided. No tribal lands were identified in this region. <http://www.bia.gov>



Confluence of the San Joaquin River at Chowchilla Bypass, 2006



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Local Jurisdictions

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Date: May 10, 2013

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MAP 4

Map 5 – DWR Integrated Regional Water Management Planning Areas

Integrated Regional Water Management (IRWM) incorporates the physical, environmental, societal, economic, legal, and jurisdictional aspects of water management into regional solutions through a collaborative stakeholder process to promote sustainable water use. IRWM improves water management and helps ensure economic stability, environmental stewardship, public safety and other benefits.

Flood management is a critical component to IRWM. As part of the Regional Flood Management Planning Effort, flood management strategies will be developed for the Flood Management Regions as part of the Regional Plan, and integrated into the IRWM Plans that coincide with the Regional Plan Area. Coordination between Regional Flood Management Planning and the overlying IRWM Planning Areas is encouraged.

Consideration on how efforts by Flood Management Planning will be integrated with ongoing IRWM planning and implementation activities being conducted by IRWM Regional Water Management Groups (RWMGs) will be necessary for assessing and comprehensively addressing water supply, water quality, flood, and ecosystem challenges.

Within the Upper San Joaquin River Flood Management Planning Region, the IRWM RWMGs that have been established and is undertaking regional planning and implementation efforts are Madera, Merced, and Westside-San Joaquin.

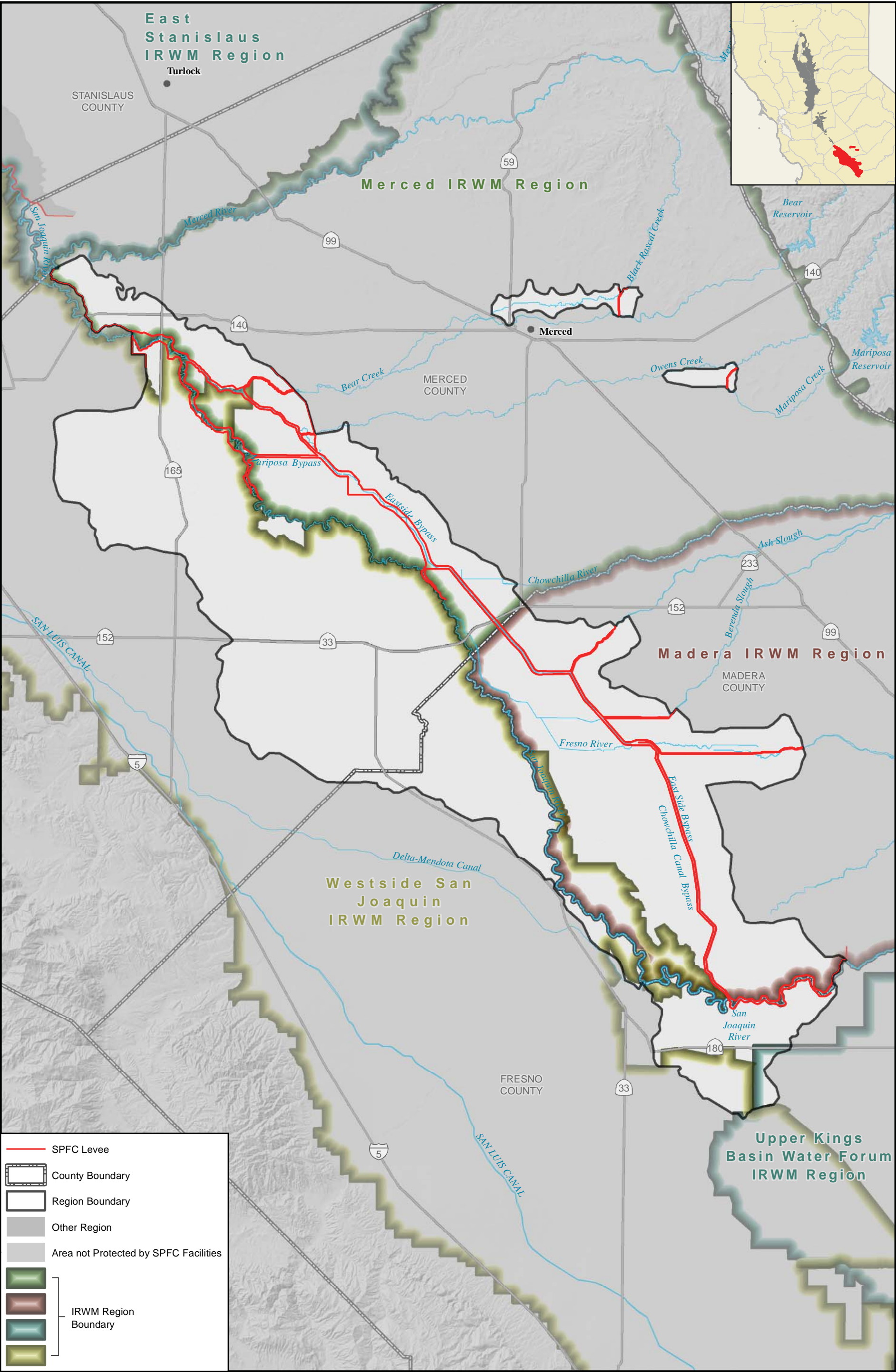
Over the past decade, California has improved its understanding of the value of regional planning and made significant steps in implementing IRWM. Recognizing the current efforts of the IRWM RWMGs and closely coordinating the approach for development of regional flood management plans will be critical for promoting and establishing a regional planning and implementation framework to achieve the goals of water supply reliability and reducing flood risks.



An example of integrated storm water management

Contact Information

IRWM Regions	Agency	Contact	Email	Phone	Agency Website
Madera	Chowchilla Redtop RCD	Jeannie Habben	info@cfwatershed.org	(209) 571-5557	http://www.eaststanirwm.org/
Merced	Merced Irrigation District	Hicham ElTal	heltal@mercedid.org		
Westside-San Joaquin	San Luis Delta-Mendota W.A.	Ara Azhderian	ara.azhderian@sldmwa.org		



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

DWR Integrated Regional Water Management Planning Areas

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Prepared By: K. Miller

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File: Z:\Projects\109146\Map05_IRWMs.mxd

MAP 5

Map 6 – General Land Use

This map presents recent general land use based on the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) Land Use Data. The following FMMP land use surveys were used to represent the land use conditions in the Upper San Joaquin River Region:

- Fresno (2008), Merced (2008), and Madera (2010) Counties

Land use is described by the following categories:

- Urban and Build-Up Lands – Urban and Built-Up land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.
- Rural and Semi-Agricultural Lands – This includes residential areas of one to five structures per ten acres. This includes semi-agricultural lands such as farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.
- Native Vegetation and Grazing Land –
 - » Land on which the existing vegetation is suited to the grazing of livestock. This category is used only in California and was developed in cooperation with the California Cattlemen’s Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
 - » Land which does not meet the criteria of any other category. Typical uses include low density rural development, heavily forested land, mined land, or government land with restrictions on use. This category was subdivided into: Rural Residential Land (R), Vacant or Disturbed Land, Confined Animal Agriculture, and Nonagricultural and Natural Vegetation beginning with the 2004 data. Subsequently, R was subdivided into: Semi-Agricultural and Rural Commercial Land and Rural Residential Land beginning with the 2006 data.
 - » Land which consists of open field areas that do not qualify for an agricultural category, mineral and oil extraction areas, and rural freeway interchanges.
- Prime and Statewide Importance Farmland –
 - » Prime Farmland - Irrigated land with the best combination of physical and chemical features able to sustain long term production of agricul-

tural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.

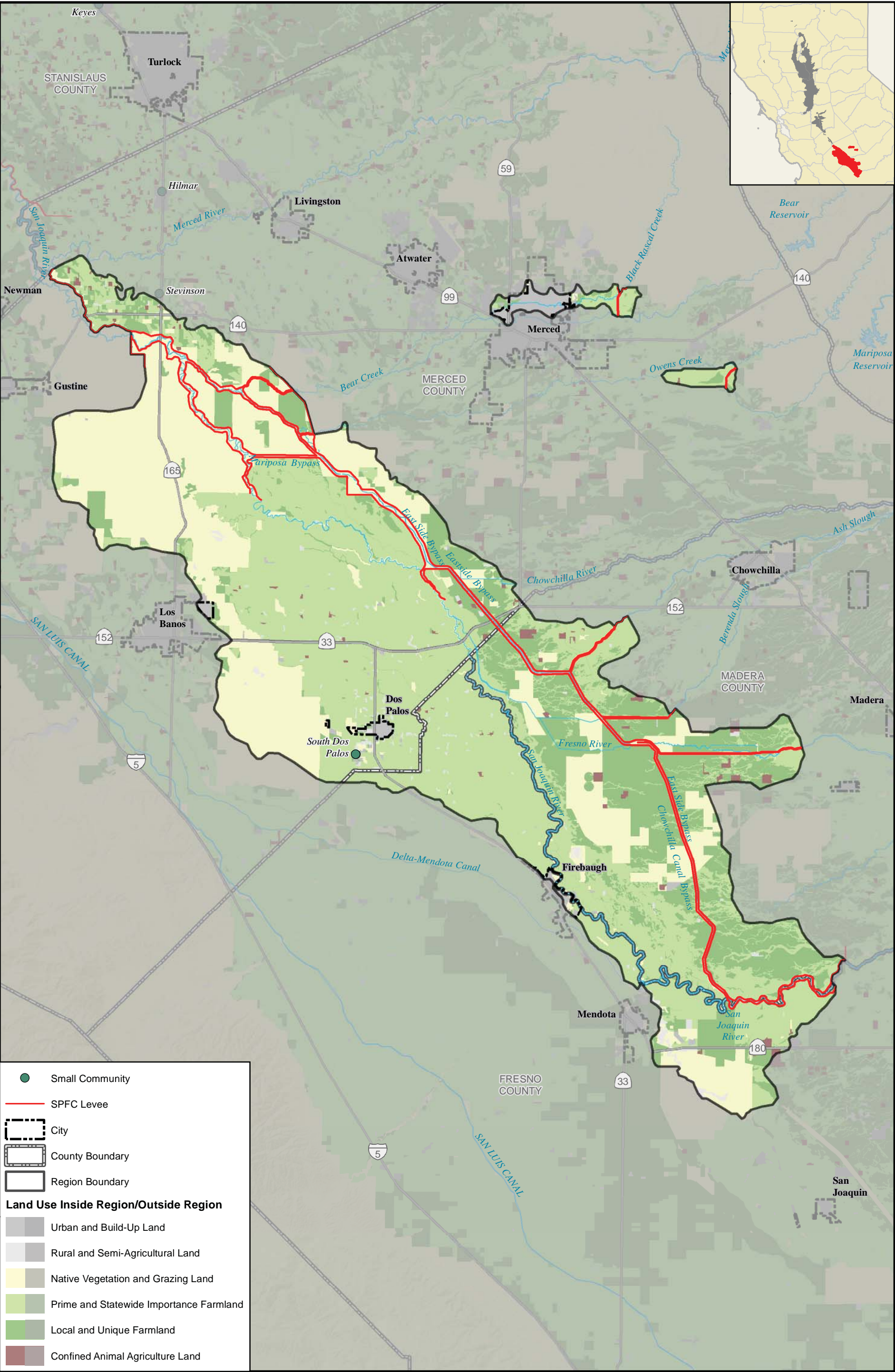
- » Farmland of Statewide Importance - Irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
- Local and Unique Farmland –
 - » Farmland of Local Importance - All farmable lands that do not meet the definitions of Prime, Statewide, or Unique. This includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land.
 - » Unique Farmland - Lesser quality soils used for the production of the state’s leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
 - » Confined Animal Agriculture Land - This includes aquaculture, dairies, feedlots, and poultry facilities. Confined Animal Agriculture qualifies for Farmland of Local Importance in some counties.

The Upper San Joaquin River Region consists mostly of agricultural land uses. There are two urban areas within the region: Firebaugh and Dos Palos.

Land Type Category	Acres of Land Type	Total % of Region
Urban and Build-Up Land	5,850	1%
Native Vegetation and Grazing Land	132,660	31%
Local and Unique Farmland	88,150	21%
Prime and Statewide Importance Farmland	189,350	45%
Confined Animal Agricultural Land	2,730	1%
Rural and Semi-Agricultural Land	2,740	1%
Total	421,480	100%



The predominant land use in the Upper San Joaquin River region is agriculture



1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

General Land Use

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Prepared By: K. Miller
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MAP 6

Map 7 – Local Maintaining Agencies

This map illustrates the various maintaining agencies within the Upper San Joaquin River Flood Management Planning Region. Maintaining agencies may be any city, county, district or other political subdivision of the State that is authorized to maintain levees. The California Department of Water Resources (DWR) maintains levees pursuant to California Water Code (CWC) Sections 8361 and 12878, and in that capacity is considered a maintaining agency. Inspection reports on the conditions of levees and/or other facilities such as channels, structures, and pump stations are briefly described below.

Local Maintaining Agency Annual Report for Levees of the State Plan of Flood Control – California Water Code Sections 9140-9141

DWR prepares the Local Maintaining Agency (LMA) Annual Report annually for the Central Valley Flood Protection Board (CVFPB) to meet the requirements of California Water Code (CWC) Section 9141.

LMAs submit specific information to DWR by September 30 of each year regarding the levees they operate and maintain. According to CWC Section 9140, the information submitted to DWR shall include all of the following five items:

- 1. Information known to the LMA that is relevant to the condition or performance of the Project Levee
- 2. Information identifying known conditions that might impair or compromise the level of flood protection provided by the Project Levee
- 3. A summary of the maintenance performed by the LMA during the previous fiscal year
- 4. A statement of work and estimated cost for operation and maintenance of the Project Levee for the current fiscal year, as approved by the LMA
- 5. Any other readily available information contained in the records of the LMA relevant to the condition or performance of the Project Levee, as determined by the CVFPB or DWR

DWR summarizes the information in a report format and provides the report to the CVFPB by December 31 of each year. Submission of information by LMA includes levee conditions and operation and maintenance activities which are essential for a comprehensive understanding of the flood protection system in the Central Valley. The information presented in this report is also critical to flood control system evaluation and assessment. The reporting status of each LMA for 2012 is presented on the table below.

2012 Inspection Report of the Central Valley State-Federal Flood Protection System

Federal Flood Control Regulations (Title 33 of the Code of Federal Regulations, Section 208.10 (33 CFR 208.10)) require that federal flood protection facilities be inspected at least four times a year — immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. In addition, inspections at intermediate times may be necessary. These periodic inspections are specifically needed to ensure that maintenance measures for project facilities are being effectively carried out, not to determine other inherent problems (geotechnical, flow capacity, etc.) with the project facilities.

The 2012 Inspection Report of the Central Valley State-federal Flood Control System is the annual report on the effectiveness of facility maintenance activities of the maintaining agencies. The report is based primarily on DWR’s inspections conducted during the summer and fall of 2012. The overall ratings (see table below) are included for each of the LMAs within the Upper San Joaquin River Region based on the one of three possible ratings based on the state of its levees:

- Acceptable (A) – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclic maintenance is being performed adequately.
- Minimally Acceptable (M) – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide.
- Unacceptable (U) – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

USACE Inspections

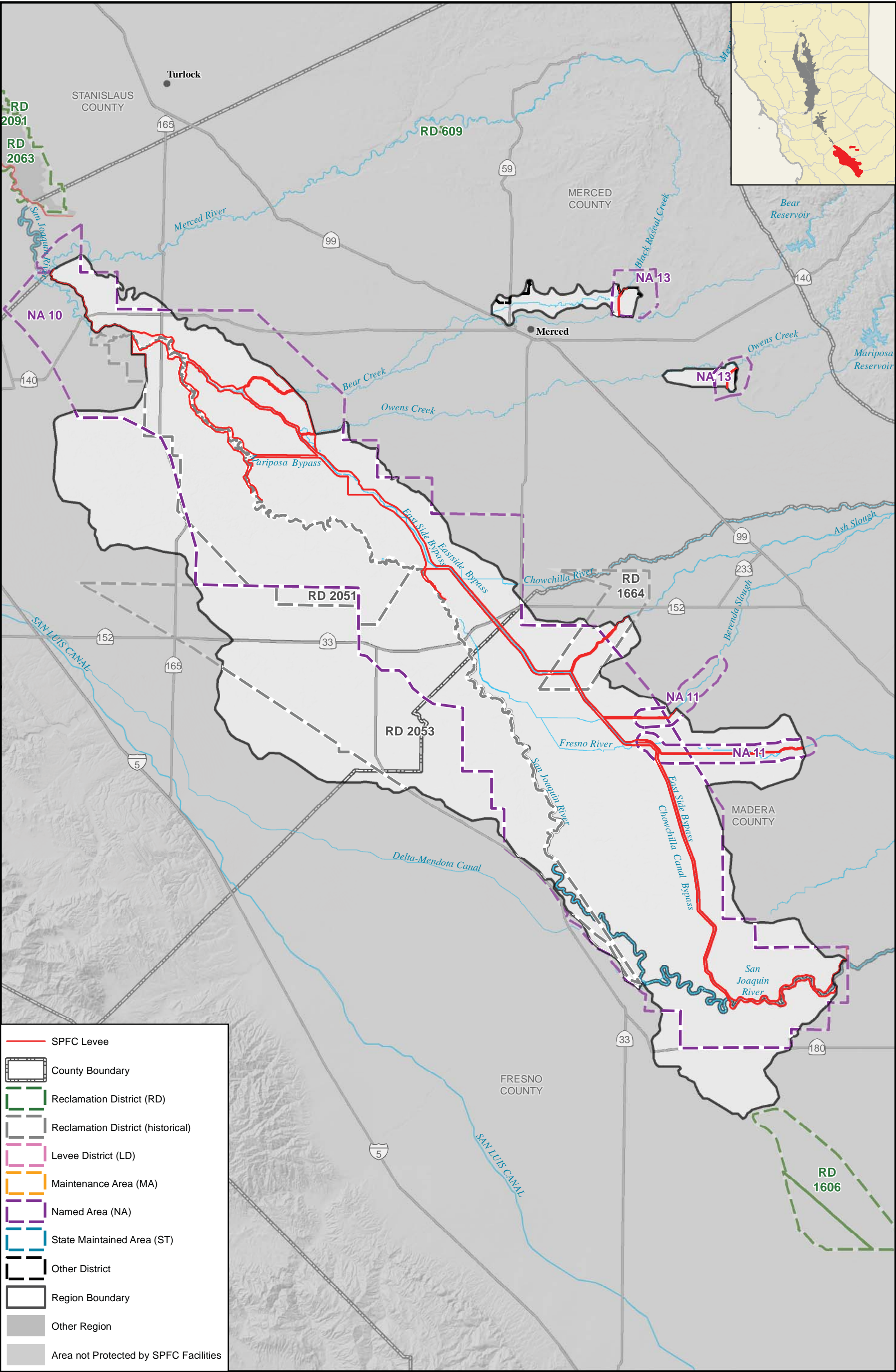
USACE conducts inspections to determine whether federal and nonfederal flood protection facilities meet federal maintenance requirements. This determination has a major bearing on eligibility for USACE’s rehabilitation assistance under Public Law 84-99. There are two types of regular inspections conducted by USACE: routine inspections and periodic inspections. Routine inspections are visual inspections conducted annually to verify that the levee system is being properly operated and maintained. Periodic inspections include a more detailed, comprehensive, and consistent evaluation of the condition of the levee system and are conducted every 5 years by a multidisciplinary team.

SPFC Maintaining Agencies	LMA 2012 Annual Reporting				
Agency Name	Part 1	Part 2	Part 3	Part 4	Part 5
Madera Co Flood Control & Water Conservation Agency, NA 11	✓	✓	✓	✓	No
Merced Co Stream Group, NA 13	✓	✓	✓	✓	✓
Lower San Joaquin Levee District, NA 10	✓	✓	✓	✓	✓
Murphy Slough at M&T Ranch, NA 14	No	✓	✓	✓	No
California Dept of Fish and Game, NA 18	✓	No	No	No	✓
Cache Creek- Sacramento Yard, ST 1	✓	✓	✓	✓	✓
East Levee Yolo Bypass-Sacramento Yard, ST 4	No	✓	✓	✓	✓
Putah Creek-Sacramento Yard, ST 7	No	✓	✓	✓	✓
Sacramento Bypass-Sacramento Yard, ST 8	✓	✓	✓	✓	✓
West Levee Yolo Bypass-Sacramento Yard, ST 11	✓	✓	✓	✓	✓
Willow Slough-Sacramento Yard, ST 12	✓	✓	✓	✓	✓
East Levee Sutter Bypass-Sutter Yard, ST 2	✓	✓	✓	✓	✓
Hamilton Bend-Sutter Yard, ST 5	✓	No	No	No	No
Nelson Bend-Sutter Yard, ST 6	✓	No	No	No	No
Tisdale Bypass-Sutter Yard, ST 9	✓	No	✓	✓	No
Wadsworth Canal-Sutter Yard, ST 10	✓	No	✓	✓	No
East Levee Sacramento River-Sutter Yard, ST 3	✓	No	✓	✓	✓
Eastern Honcut Creek, NA 6	No	No	No	No	No

*Overall unit threshold percentage is less than 10.00%, however, U rated miles are present, so the overall unit rating is M instead of A.

¹The number of channels/structures/pumping plants is presented as (number of structures) followed by rating.

Contact information for the Local Maintaining Agencies can be found in *Directory of Flood Control Officials* published by DWR in September 2011. Detailed information, such as facility modification history, Operations and Maintenance Manuals used and financial data, for local agencies that maintain SPFC facilities can be found in the *Operations & Maintenance Roles and Responsibilities Technical Memorandum* published by DWR in April 2012.



1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Local Maintaining Agencies

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STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map07_LMAS.mxd

MAP 7

Map 8 – Existing Critical Facilities and Economic Assets

Protected assets and their locations often determine the capability of a Region and its special districts ability to respond to emergencies. The location of these protected assets can also impact the potential losses when a disaster occurs. An inventory of the protected assets is shown on this map.

Upper San Joaquin River Flood Planning Region

Over the last century, the Central Valley has experienced intensive development to meet the needs of a growing population. A complex flood risk management system supports and protects a vibrant agricultural economy, several cities and numerous smaller communities and associated infrastructure. The current SPFC flood control system throughout the Central Valley protects a population of over one-million people and billions of dollars worth of assets that are currently located within flood plains, including major freeways, railroads, airports, water supply systems, utilities, and other public and private infrastructure of significant regional and statewide importance.

The Upper San Joaquin River Flood Planning Region is rich in these existing assets that are potentially at risk should a flood emergency occur. The Upper San Joaquin River Flood Management Planning Region consists of predominantly rural agricultural land, but also contains several small cities and communities such as Dos Palos and Firebaugh. A detached, separate area included in this flood protection zone contains a portion of the City of Merced.

The Existing Critical Facilities and Economic Assets map indicates existing critical facilities and regional assets identified within the Planning Region, located from various available maps and GIS sources. It is not a complete inventory of all valuable regional assets and facilities, nor is it intended to be. The following list of potential Regional at-risk assets identifies common types of typical assets that may exist, and should be considered, within the Flood Planning Region.

Potential Regional At-Risk Assets

State and Federal Facilities

- State and Federal Highways / Bridges
- Courthouses
- Post Offices
- Prisons
- Military Facilities
- Water Infrastructure
- Canals
- SPFC Levees

Local / County Facilities

- Jails and Detention Centers
- Government Buildings
- Roadways / Bridges
- Transit Centers
- Water / Wastewater facilities
- Airports
- Reservoirs / Aqueducts
- Parks / Zoos
- Local Non-Project Levees

Health and Public Safety

- Hospitals
- Convalescent Facilities
- Medical Facilities / Clinics
- Police
- Fire
- Highway Patrol

Education

- Public Schools
- Libraries
- Colleges / Universities

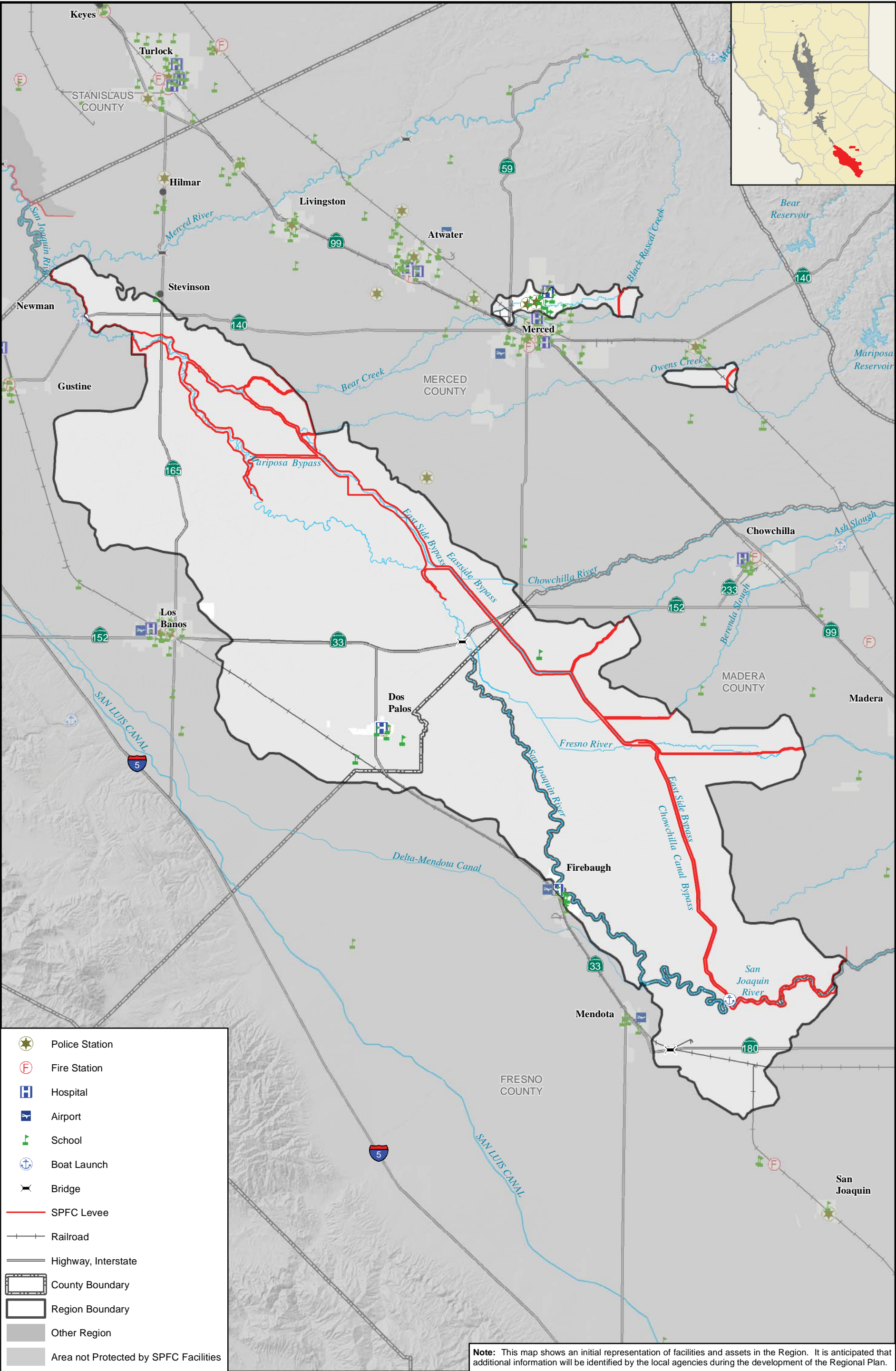
Other Critical Public Assets / Infrastructure

- Bus Terminals
- Railroad Stations
- Railroad Tracks / Yards
- Power Facilities / Substations
- High Voltage Transmission Facilities
- Pipelines
- Stadiums / Arenas / Entertainment Venues
- Regional Shopping Malls
- Hazmat Storage Areas
- Docks / Harbors / Launching Facilities

Note: This map shows an initial representation of facilities and assets in the Region. It is anticipated that additional information will be identified by the local agencies during the development of the Regional Plan.



Agriculture dominates much of the Upper San Joaquin River Region



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper San Joaquin River

Existing Critical Facilities and Economic Assets

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map08_ExistingAssets.mxd

MAP 8

Map 9 – SPFC and Local Flood Control Facilities

The Upper San Joaquin River Flood Management Planning Region contains flood control facilities both locally owned and operated as well as State owned and operated through the State Plan of Flood Control (SPFC). The main purpose of these facilities is to control storm water runoff and protect the local population in the region from flood risks. The SPFC facilities also serve the purposes of creating hydroelectric power and managing and conveying the State’s potable water supply. SPFC facilities in the region are listed and briefly explained below.

Chowchilla Canal Bypass Control Structure – Located at the start of the Chowchilla Bypass, the control structure works to direct the bifurcation, or splitting, of the San Joaquin River into the Chowchilla Bypass. Water enters the bypass system from the San Joaquin River through the Chowchilla Canal Bypass Control Structure. The structure has four gated bays, each 20 feet wide, with a total design capacity of 5,500 cfs. The Chowchilla Canal Bypass Control Structure operates in conjunction with a nearby identical structure across the San Joaquin River, San Joaquin River Control Structure.

Chowchilla Bypass – This bypass flows from the Chowchilla Bypass Control Structure on the San Joaquin River to the Eastside Bypass. This bypass is used for flood conveyance, and as a settling basin for debris.

San Joaquin River Control Structure – Located near the intersection of the Chowchilla Bypass and the San Joaquin River, the control structure works to direct the bifurcation, or splitting, of the San Joaquin River into the Chowchilla Bypass. Water which is not redirected into the Chowchilla Bypass from the San Joaquin River is controlled by this structure. The structure has four gated bays, each 20 feet wide, with a total design capacity of 5,500 cfs. The San Joaquin River Control Structure operates in conjunction with a nearby identical structure, the Chowchilla Canal Bypass Control Structure.

Mariposa Drop Structure – Located at the downstream end of the Mariposa Bypass, this drop structure is designed to control channel grade by passing the water to a lower elevation while controlling the energy and velocity of the water.

Eastside Bypass Drop Structure No. 1 & 2 – Located at the confluence of the Fresno River and the Chowchilla Bypass, two drop structures help control the channel grade by passing the water to a lower elevation while controlling the energy and velocity of the water.

Mendota Dam – Located at the confluence of the San Joaquin River and Fresno Slough. The dam creates the Mendota Pool, which is a small reservoir supplied by Delta-Mendota Canal, San Joaquin and Kings Rivers during floods. Water from the Mendota Pool is used for agricultural irrigation during the dry season. Water is pumped to the pool from the Delta by way of the Delta-Mendota Canal. There are several issues and potential projects surrounding the Mendota Dam in regards to salmon habitat and rehabilitation.

San Joaquin River Control – Located at the intersection of the San Joaquin River and the San Joaquin River Control, this control structure acts to re-

direct some of the water from the Eastside Bypass into the San Joaquin River. Water which is not redirected continues into the Eastside Bypass. This structure has remained closed, preventing water from entering the San Joaquin, for many years.

Ash Slough Drop Structure Numbers 1-4 – Located along Ash Slough upstream of its intersection with the Eastside Bypass, this series of drop structures are designed to control the channel grade, by passing the water to a lower elevation while controlling the energy and velocity of the water.

Sand Slough Control Structure – Located at the confluence of the San Joaquin and Eastside Bypass. This control structure acts to manage San Joaquin River flows to allow water to enter the Eastside Bypass or San Joaquin River through the San Joaquin River control structure.

Eastside Bypass Control Structure – Located at the intersection of the Eastside bypass and Mariposa Bypass, this control structure acts in conjunction with the Mariposa Bypass Control Structure to control water from the Eastside Bypass which is not redirected into the Mariposa Bypass. Once the water passes the control structure, it will continue on to the San Joaquin River.

Mariposa Bypass Control Structure – Located at the intersection of the Eastside bypass and Mariposa Bypass, this control structure acts in conjunction with the Eastside Bypass Control Structure to divert water from the Eastside Bypass into the Mariposa Bypass where it will continue on to the San Joaquin River.

Sack Dam – Located at the intersection of the San Joaquin River and the Arroyo Canal, Sack Dam is a smaller structure that provides water storage and diversion for agricultural irrigation. Restorations efforts are underway for salmon passage and habitat projects surrounding this facility.

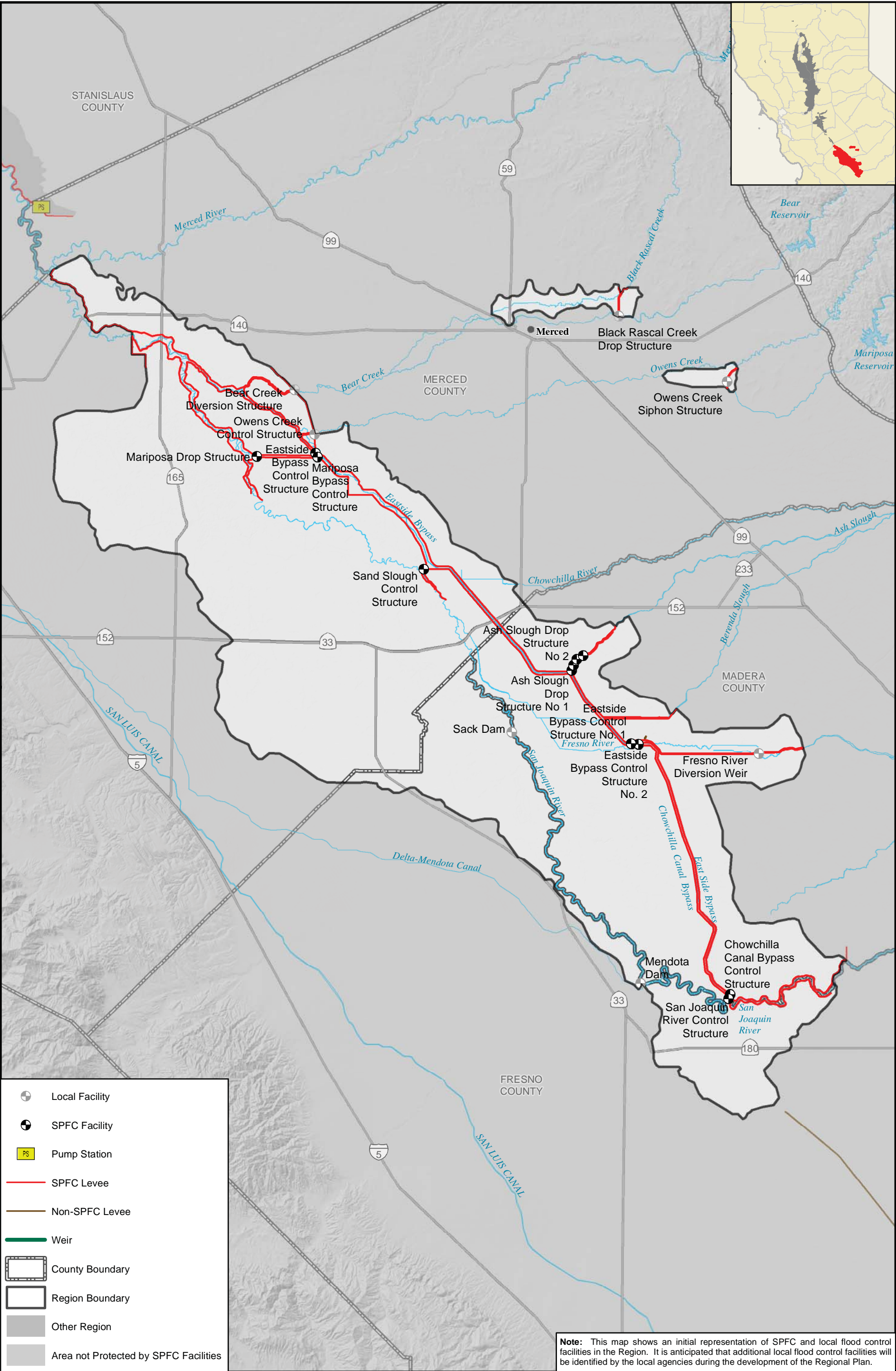
Eastside Bypass – Traveling parallel to the San Joaquin River, the bypass flows the length of the region and connects the San Joaquin River with other various tributaries in the region. This bypass begins at the downstream end of the Chowchilla Bypass at the Fresno River confluence. The bypass collects water from the Fresno River, Berenda Slough, Ash Slough, Chowchilla River, Owens Creek and Bear Creek. The bypass acts to collect water and redirect it further downstream to protect low lying, valley communities from flood.

Mariposa Bypass – The bypass is located between the Mariposa Bypass Control Structure and the Mariposa Drop Structure. This channel allows water to flow from the Eastside Bypass into the San Joaquin River at the downstream end of the region.

San Joaquin River – The Lower San Joaquin Flood Control Project included channel improvements on the river that extend from the Merced River to Gravely Ford (excluding that portion of the river situated between Mendota Dam and the San Joaquin River Control Structure). The channels were cleared of debris and vegetation (not including grass or crops) to increase the floodwater carrying capacity. The project Operation and Maintenance manual calls for the channels of the project to be maintained and kept clear of re-growth of vegetation to insure the floodflow characteristics of the project channels.



Sand Slough Control Structure



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

SPFC and Local Flood Control Facilities

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map09_SPFCLocalFloodCtrl.mxd

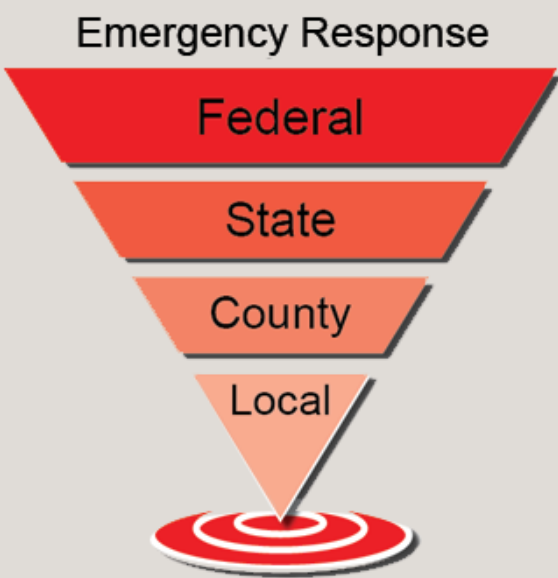
MAP 9

Map 10 – Flood Emergency Response Facilities

Critical Emergency Response facilities and their locations often determine the capability of a region and its special districts ability to respond to emergencies. The location of these critical facilities can also impact the potential losses when a disaster occurs. An inventory of the critical emergency response facilities is shown on this map. (FloodER red triangle graphic is shown here)

As set forth in the California Government Code, the California Public Contract, the California Water Code, and the State Emergency Plan, the Department of Water Resources is the lead State agency for responding to flood emergencies; however every emergency begins at the local level and timely coordination of response efforts is critical to saving lives, property, and the environment. Emergency response planning provides a guide to Local Maintaining Agencies (LMA), Operational Areas (OA), and Department of Water Resources (DWR) for addressing flood threats as quickly as possible using the Standardized Emergency Management System (SEMS) and the Incident Command System (ICS). It is vital that local and county agencies follow SEMS and ICS protocols for addressing threats at the local level and have complete up-to-date emergency action plans that:

- Streamline communications (contact information, call tree, radio frequencies, protocols)
- Provide preparation and activation protocols
- Identify Emergency Operation Center locations
- Provide a management structure for emergency work
- Provide protocols for prioritizing actions
- Direct resources effectively during an emergency



- Provide locations and procedures to obtain necessary resources (i.e., equipment, materials, manpower)
- Identify critical sites or problem areas that need special attention
- Identify critical infrastructure
- Provide an evacuation plan and rally points
- Include training and exercise schedule

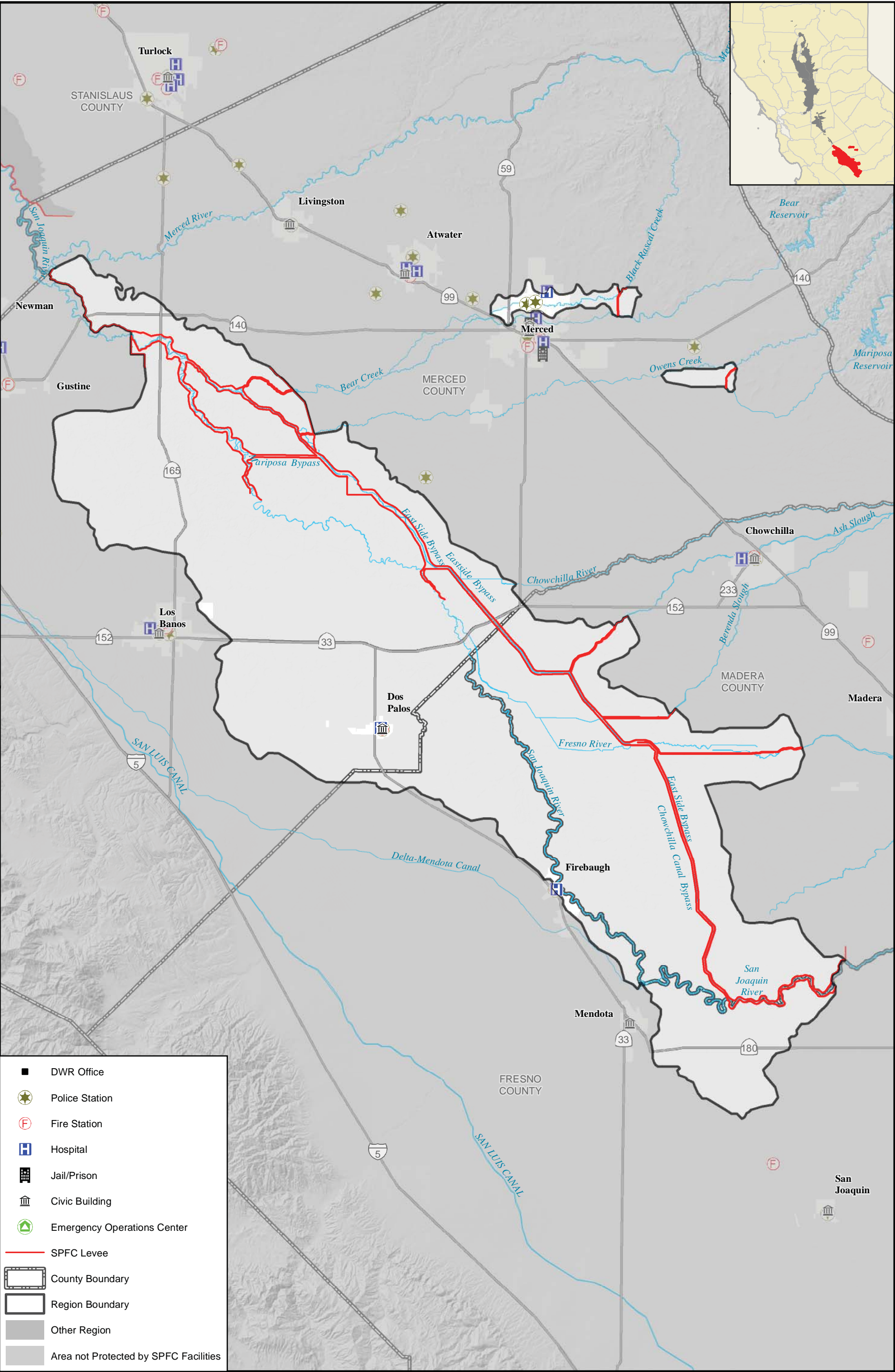
LMA Emergency Action Plans support County level emergency response plans and need to be included in the flood hazard component of a Multi-Hazard Mitigation (MHM) Plan. The contact information for Flood Emergency Managers in the Upper San Joaquin River region is provided below.

OA (County Agency)	Emergency Contact #	Address	MHM Plan contains flood hazard component
Fresno County Emergency Services	559-445-3391	P.O. Box 11867, Fresno, CA 93775	Yes
Merced County Emergency Services	209-385-7548	735 Martin Luther King Jr. Way, Merced, CA 95340	No
Madera County Emergency Services	559-675-7770	14143 Road 28, Madera, CA 93638	No
State Agency	Emergency Contact #	Address	
DWR Flood Operations Center	916-574-2619	3310 El Camino Ave, Suite 200, Sacramento, CA 95821	
Cal EMA Inland Region	916-845-8911	3650 Schriever Ave, Mather, CA 95655	

DWR does not declare emergencies, order or coordinate evacuations, or coordinate shelters. DWR supports local flood emergency response by providing real-time weather and hydrology conditions and warnings, technical assistance, information dissemination, and flood fight resources through specific requests from California Emergency Management Agency (CalEMA) Operational Areas.



Members of the California Conservation Corps (CCC) Place sandbags on a levee



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Flood Emergency Response Facilities

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map10_FloodER.mxd

MAP 10

Map 11 – Overall Levee Conditions

The overall physical condition of SPFC levees is shown on this map. It includes a simplified representation of levee conditions, based on Urban Levee Evaluations (ULE) and Non-Urban Levee Evaluations (NULE) results that are not directly comparable because different evaluation methodologies were used for each project. The map is intended to show broadly which levee reaches are of relatively higher, medium, and lower concern, based on physical conditions of the levees. Levees shown as purple (higher concern) on the map generally display more performance problems than those shown in green (lower concern). Results do not reflect economic or life safety consequences of flooding, which are key factors in planning system repairs and improvements.

Levee Status Factors were evaluated in the Flood Control System Status Report (FCSSR) according to the following status factors:

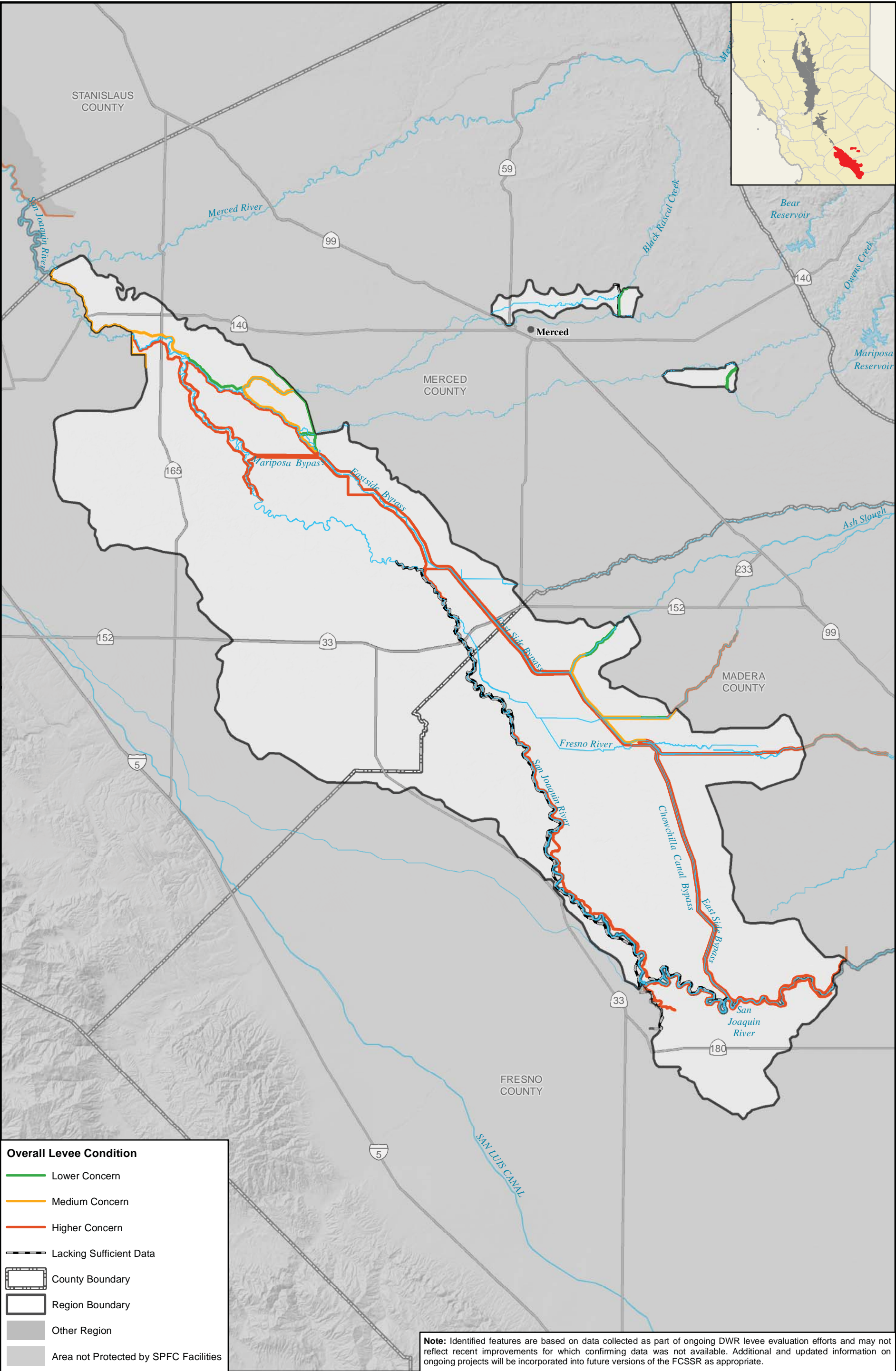
- Inadequate Levee Geometry (Levee Geometry Check) – Levee crest elevations that are too low, crest widths that are too narrow, and levee side slopes that are too steep can reduce levee stability and lead to failure.
- Seepage – Seepage under a levee foundation or through a levee can reduce levee stability and lead to failure.
- Structural Instability – Slides, sloughs, slope depressions or bulges can reduce levee stability and lead to failure.

- Erosion – Levee and bank erosion can directly reduce levee cross sections and shorten seepage paths, leading to failure.
- Settlement – Levee settlement or land subsidence over years can result in levee crest elevations lower than designed, reducing freeboard or causing water to overtop a levee.
- Penetrations – Irrigation and drainage pipes, utilities, and other structures through levees may create seepage paths. Seepage along the penetrations, or through deteriorating penetrations, could wash away levee material and lead to failure. Lack of positive closure devices on pipes penetrating levees can also lead to localized flooding.
- Levee Vegetation – Vegetation on levees can interfere with floodfighting efforts and maintenance by reducing visibility and accessibility. The extent that levee vegetation impacts levee integrity is the subject of ongoing research.
- Rodent Damage – Burrowing animals can create holes in levees that can create seepage paths and lead to levee failure.
- Encroachments – Encroachments (such as debris, fences, and structures) on SPFC facilities can interfere with floodfighting efforts and maintenance and, in some cases, reduce levee stability, which can lead to levee failure.

Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirmed data was not available.



The overall physical condition of SPFC levees is based on Urban Levee Evaluations and Non-Urban Levee Evaluations, and inspections completed by Local Maintaining Agencies (LMA's) and DWR



1" = 5 miles

0 1.25 2.5 5 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Overall Levee Conditions

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Date: May 10, 2013
File: Z:\Projects\109146\Map11_Hazard_overall.mxd

MAP 11

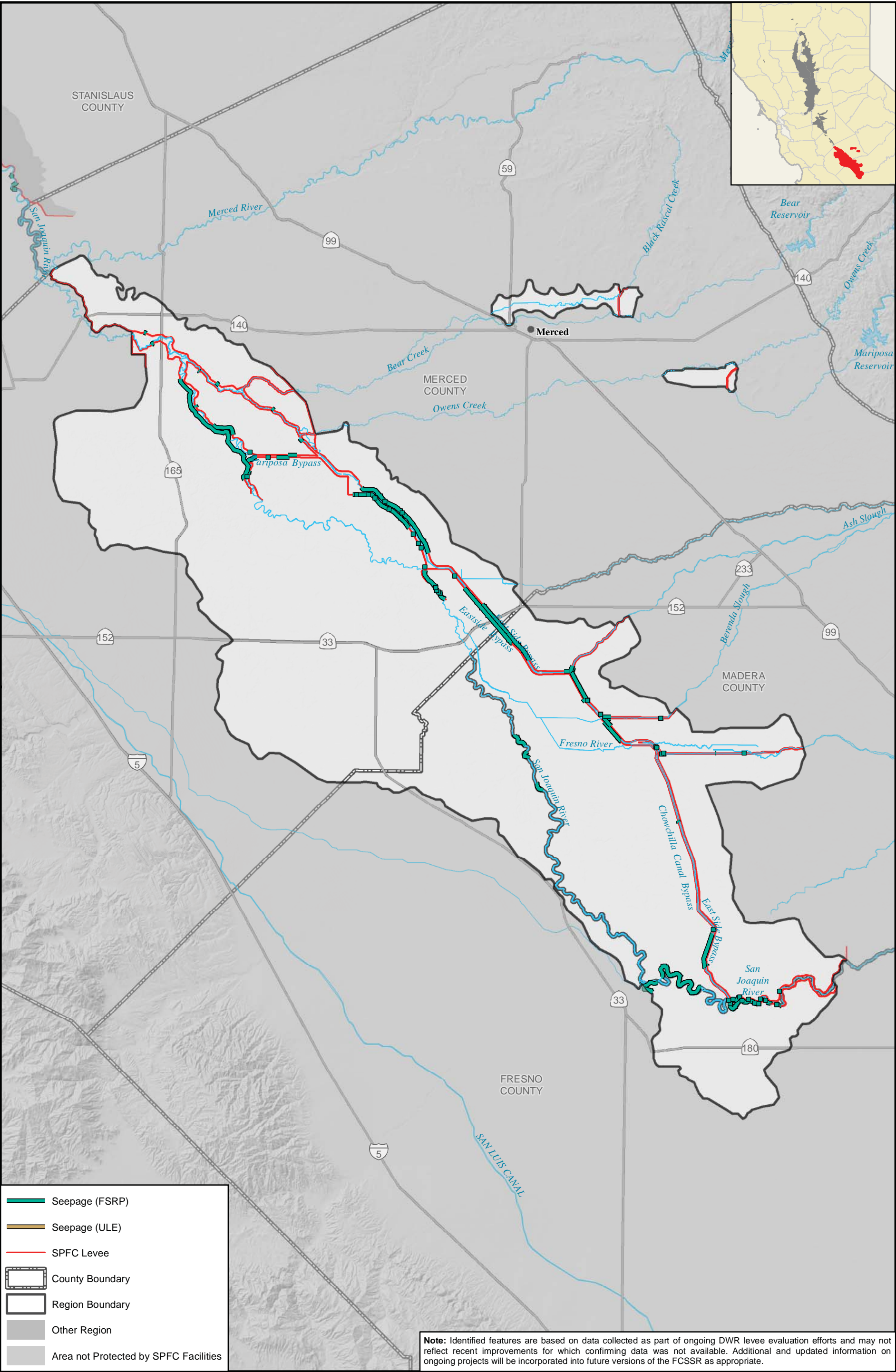
Map 12 – Seepage Past Performance Problems

This map shows the seepage past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program

(FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of seepage



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River
Seepage Past Performance Problems

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Date: May 10, 2013

File: Z:\Projects\109146\Map12_Seepage.mxd

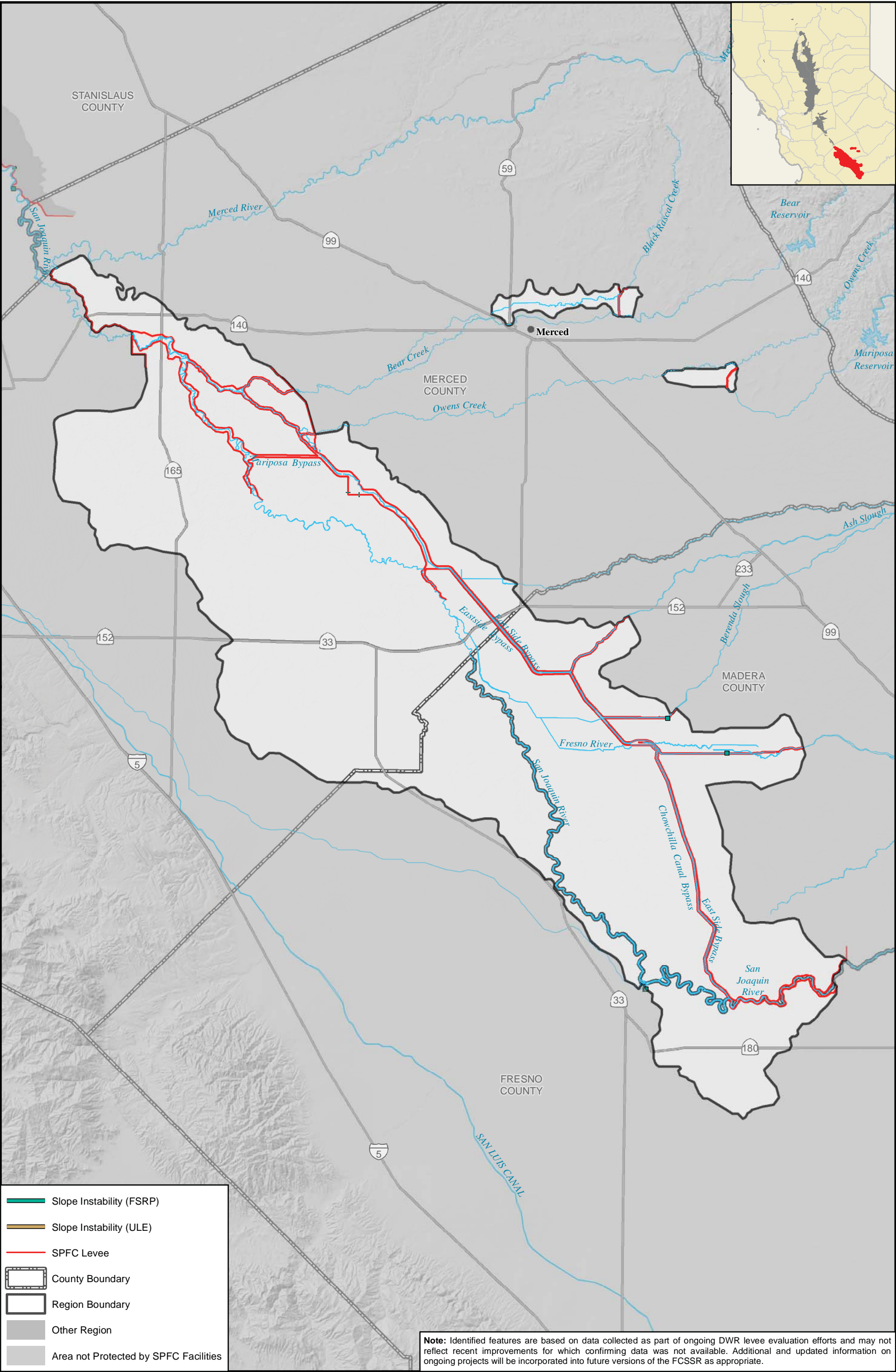
MAP 12

Map 13 – Slope Instability Past Performance Problems

This map shows the slope instability past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of slope instability



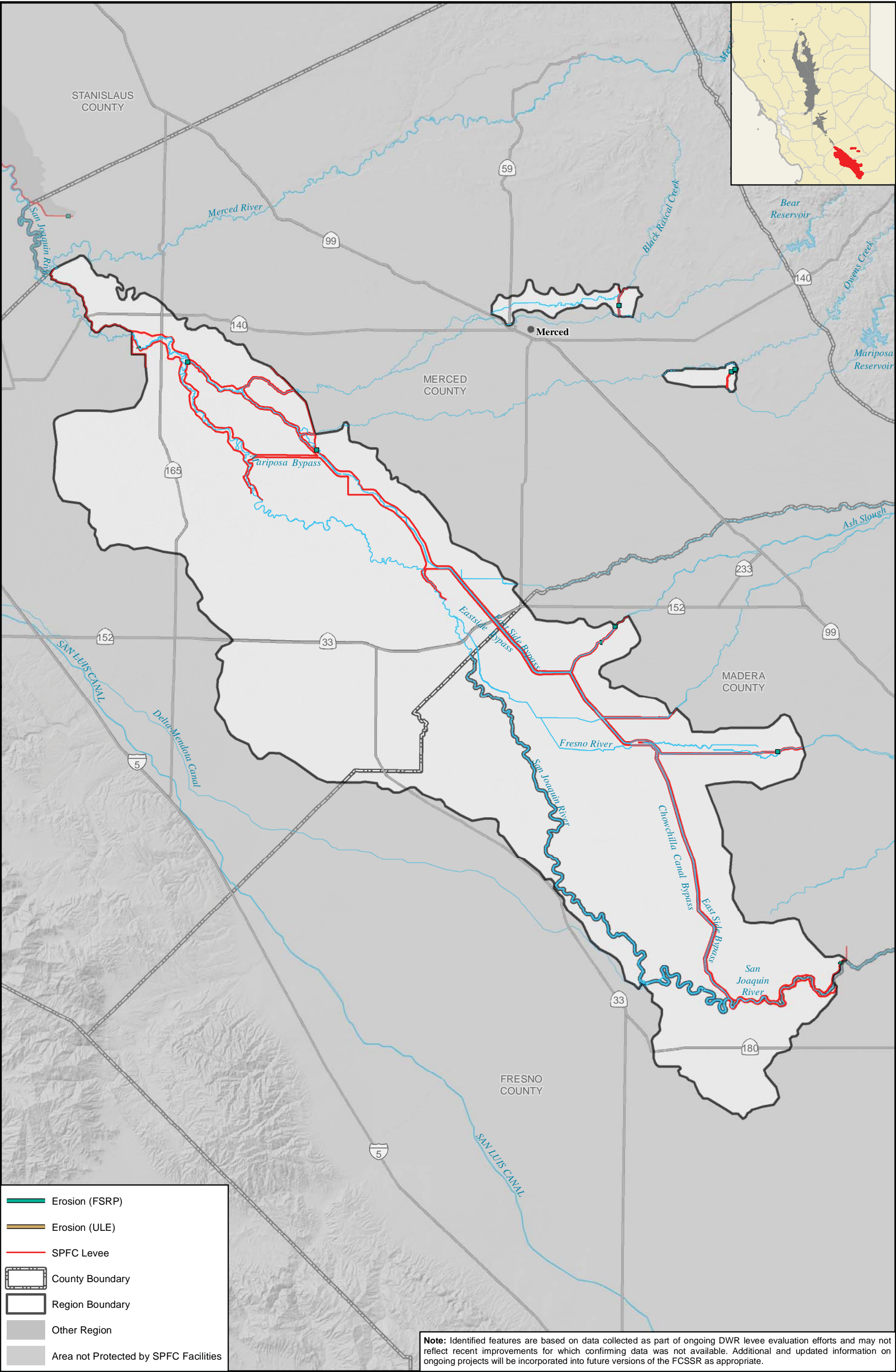
Map 14 – Erosion Past Performance Problems

This map shows the erosion past performance problems based on information collected as part of ongoing DWR levee evaluation efforts, Urban

Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP), and may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of erosion



1" = 5 miles

0 1 2 4 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Erosion Past Performance Problems

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map14_Erosion.mxd

MAP 14

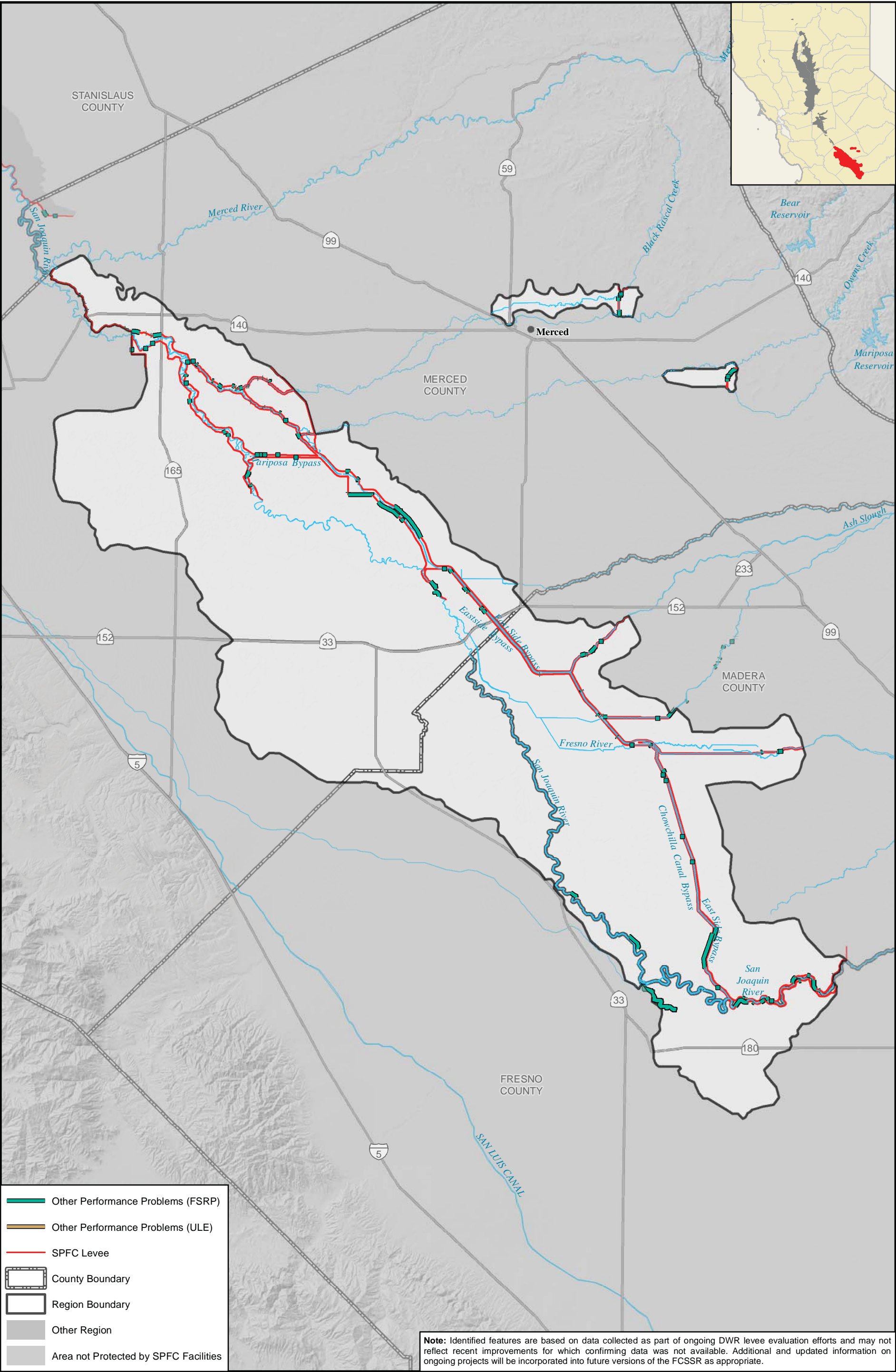
Map 15 – Other Past Performance Problems

This map shows information collected, outside of seepage, levee stability, and erosion issues, as part of ongoing DWR levee evaluation efforts, Urban Levee Evaluation (ULE) program and the Flood System Repair Program (FSRP).

The “other” performance problem category generally includes – historical overtopping, breach occurrences, relief cuts, subsidence, burrows, and anthropogenic damage. This data may not reflect recent improvements for which confirming data was not available. This information was originally presented in the *Flood Control System Status Report (FCSSR)* (December 2011).



An example of a levee breach



1" = 5 miles

0

1.25

2.5

5

Miles

N

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper San Joaquin River
Other Past Performance Problems

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Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map15_OtherProblems.mxd

MAP 15

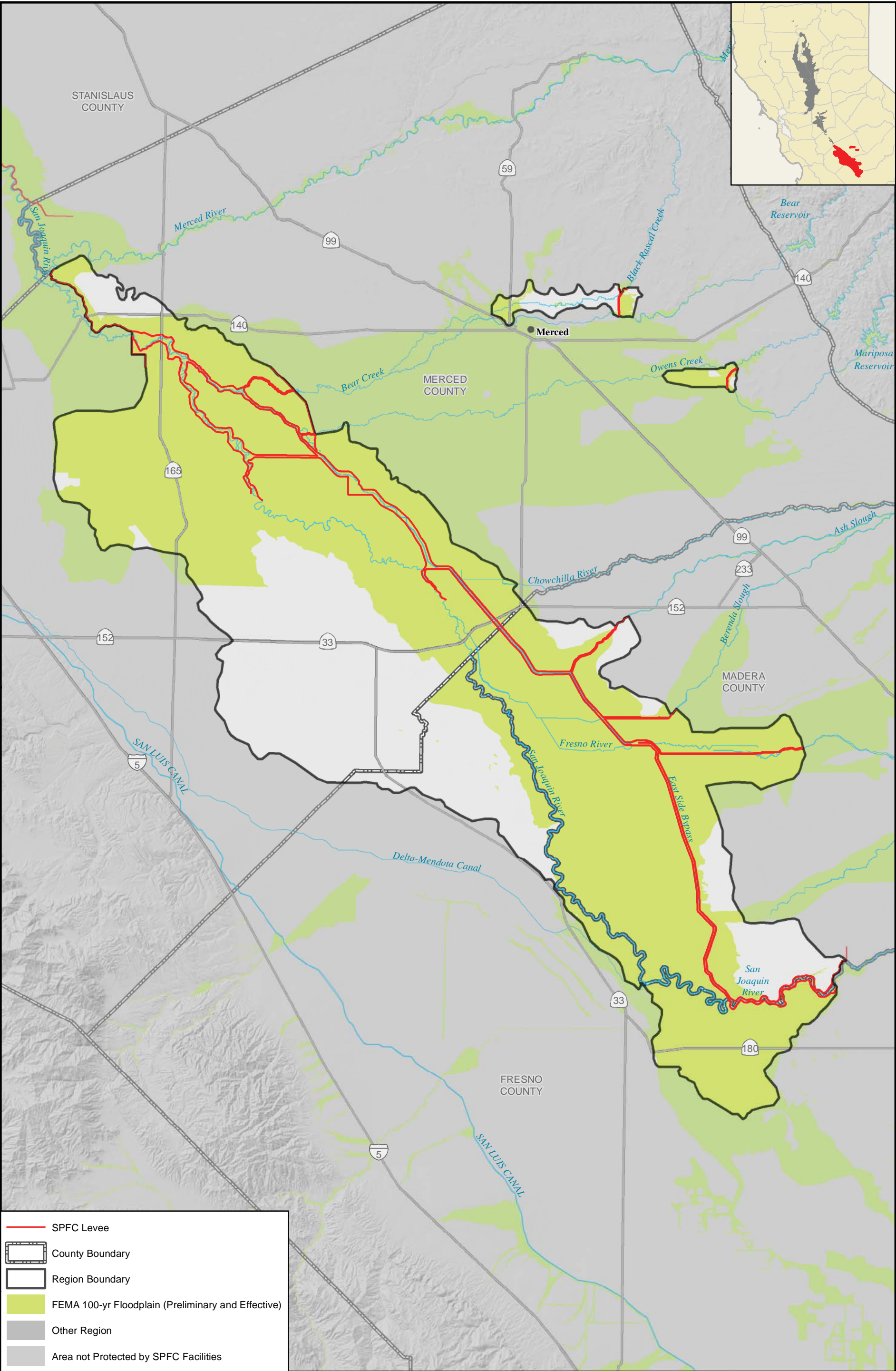
Map 16 – FEMA 100-Year Floodplain

FEMA flood zones are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. These zones are depicted on a community’s Flood Insurance Rate Map (FIRM). The FEMA 100-year floodplain represents the flood zones that are

subject to flooding from the 1% annual chance flood. The FEMA 100-year floodplains were obtained from FEMA in February 2013. For the latest floodplain information, please visit FEMA’s Map Service Center at <http://msc.fema.gov/>. The FEMA effective floodplains are shown on FEMA’s Effective Flood Insurance Rate Maps and used for regulatory purposes.



Water being released at Friant Dam, April 2011



1" = 5 miles

0

1

2

4

Miles

Datum: NAD 83
Zone: N/A
Sources: See Appendix for source citations

Projection: CA (Teale) Albers
Units: meters

Regional Flood Management Planning

Upper San Joaquin River
FEMA 100-Year Floodplain

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Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map16_FloodInundation_FEMA.mxd

MAP 16

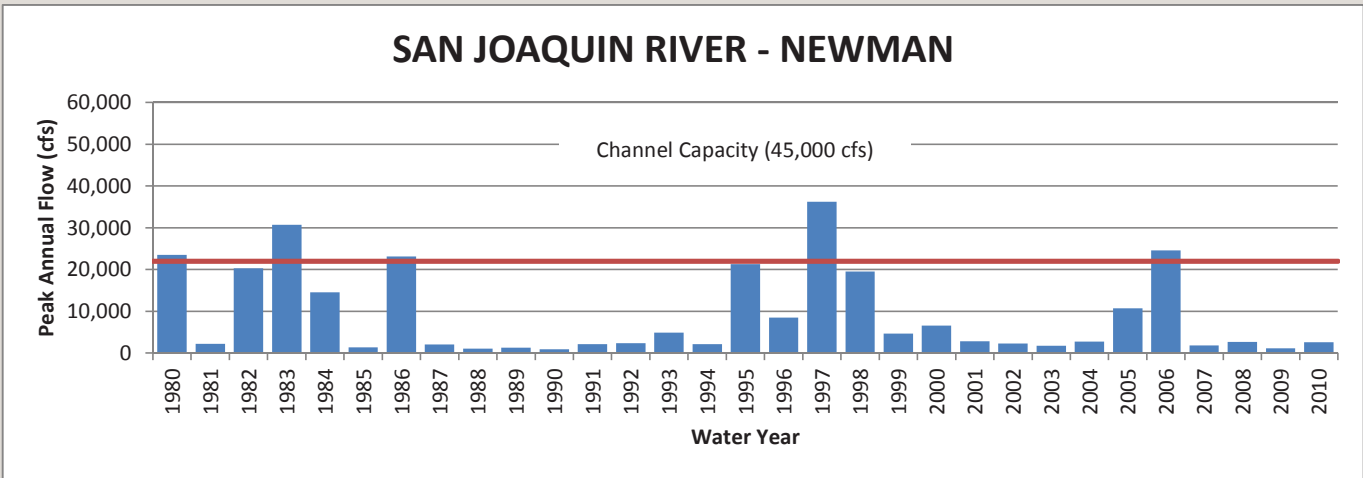
Map 17 – Channel Capacities and Flood Forecast Monitoring Network

Conveyance capacity is defined as the maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can carry without exceeding a threshold value such as flood discharge, or without using the freeboard distance from the top of a levee.

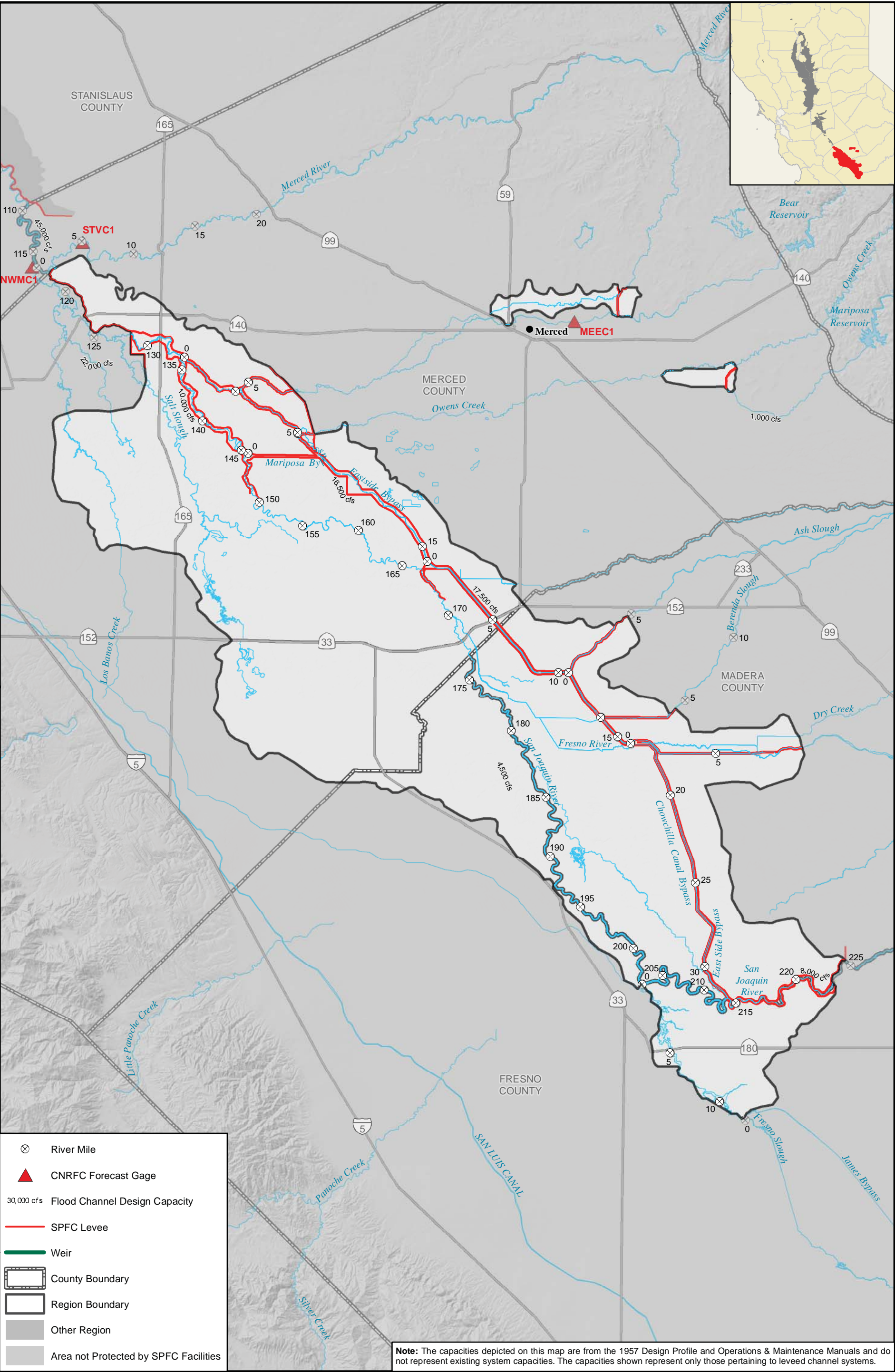
Design Channel Capacity - Design channel capacities were calculated from the design profiles based on steady-state, uniform flow hydraulic computations of historical floods using data available at the time. Therefore, design channel capacities were based on a very limited hydrological record, were highly dependent on the boundary conditions assumed, and did not consider variations in flow and depth with respect to time and distance. Furthermore, the design profiles could not account for changes in vegetation and sedimentation patterns within the channels, or flood system improvements that have taken place after the historical floods used to derive the design flood flow capacities. For example, the 1955 historical flood used to determine the 1955 design profile for the San Joaquin River downstream from the Merced River confluence occurred before construction of the San Joaquin River bypass system.

Flood Monitoring Network - Under the authority of the California Water Code Section 236, the River Forecasting Section works with the National Weather Service’s California-Nevada River Forecast Center (CNRFC) to provide year-round daily forecasts of reservoir inflows, river flows, and water levels throughout California and in parts of Nevada. These forecasts are used by the Flood Operations Branch and the National Weather Service to determine the level of joint Federal-State flood response activation and operations. During high water events, Federal and State river forecasters work around the clock to update their forecasts and monitor real-time changes in California and Nevada’s larger rivers and estuaries.

Gages are located throughout the Sacramento and San Joaquin River Systems. The peak annual flow is shown for selected gages for the 1980 to 2010 period where historical flow data was readily available. In the Upper San Joaquin River Region the peak annual flows at the Newman forecast point is shown in the bar chart below.



San Joaquin Upstream of Bifurcation Structure



1" = 5 miles

0

1

2

4

Miles

N

Datum: NAD 83

Projection: CA (Teale) Albers

Zone: N/A

Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River

Channel Capacities and Flood

Forecast Monitoring Network

DRAFT

DRAFT

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STATE OF CALIFORNIA

Prepared By: K. Miller

Date: May 10, 2013

File: Z:\Projects\109146\Map17_ChannelCapacities.mxd

MAP 17

Map 18 – Managed Environmental Lands

This map shows the extent of lands that are currently being managed by federal, State, or private entities. The current mapped information is listed below:

- National Wildlife Refuge, USFWS, 2011.
 - » Description from metadata: “This data layer depicts the simplified boundaries of lands and waters administered by the U.S. Fish and Wildlife Service (USFWS) in North America, U.S. Trust Territories and Possessions. It includes only lands that are held by fee or secondary title by USFWS. The primary source for this information is the USFWS Realty program.”
- Department of Fish & Game Lands, DFG, 2011.
 - » This layer includes all of DFG (now Department of Fish and Wildlife) Owned and Operated Lands. These are only lands owned with fee title. The only lands shown on Map 13 are those designated as “Ecological Reserve” or “Wildlife Area”.
- The Nature Conservancy Lands, TNC, 2011.
 - » Description from metadata: “A spatial dataset of lands and waters that The Nature Conservancy has a legal interest in (such as a conservation easement or fee-simple ownership). Includes spatial data from TNC’s Conservation Lands System (CLS) database, which is the legal database of record for all TNC land transactions (fee, easement, lease and deed restrictions).”

Upper San Joaquin River Region Managed Environmental Lands

Managed Land Type	Area (square miles)	Acres
National Wildlife Refuge (USFWS)	22	13,762
Department of Fish and Wildlife Lands	26	16,783
The Nature Conservancy Lands	0	0

Described managed lands are those lands located within the region or adjacent to the region.

Alkali Sink Ecological Reserve

The Department of Fish and Game’s Alkali Sink Ecological Reserve encompasses approximately 945 acres of shrubland/grassland. The area is regularly used by greater and lesser sandhill cranes, northern harriers, Swainson’s hawks, mountain plovers, burrowing owls, and tricolored blackbirds.

Kerman Ecological Preserve

The DFW’s Kerman Ecological Preserve encompasses approximately 1,785 acres. The area provides habitat for San Joaquin Kit Fox, Fresno Kangaroo Rat, blunt nose leopard lizard and vernal pools for western spade foot toad, fairy shrimp, and shore birds.

Los Banos Wildlife Area

The Department of Fish and Wildlife’s Los Banos Wildlife area encompasses 6,217 acres of wetland habitat which includes lakes, sloughs and managed marsh. This wildlife area provides habitat for Western pond turtles,

raccoons, striped skunks, beaver and muskrats, as well as over 200 species of birds.

Mendota Wildlife Area

The Department of Fish and Wildlife’s Mendota Wildlife Area encompasses 11,802 acres consisting of flatlands and floodplain. The wildlife area provides habitat for as many as 65 species and sub-species of birds, including shorebirds, songbirds, raptors, waterfowl and wading birds. The wildlife area also provides habitat for such as coyotes, muskrats, beavers, minks, raccoons, weasels, black-tailed hares, cottontail rabbits, spotted and striped skunks, and ground squirrels.

Merced National Wildlife Refuge

The Merced National Wildlife Refuge encompasses 10,258 acres of wetlands, native grasslands, vernal pools, and riparian areas. It was established in 1951 under the Lea Act to attract wintering waterfowl away from adjacent farmland where foraging ducks and geese were causing extensive damage to crops.

The refuge hosts the largest wintering populations of lesser sandhill cranes and Ross’ geese along the Pacific Flyway. The refuge provides important breeding habitat for Swainson’s hawks, tri-colored blackbirds, marsh wrens, mallards, gadwall, cinnamon teal and burrowing owls. Coyotes, ground squirrels, cottontail rabbits, beaver and long-tailed weasels can also be seen year round.

North Grasslands Wildlife Area

North Grasslands Wildlife Area consists of 7,069 acres of wetlands, riparian habitat and uplands. These restored and created wetlands are now habitat for the Swainson’s hawk and sandhill crane. This land is managed by the California Department of Fish and Wildlife. The Gadwell Unit is inside the boundaries of the region and the China Island Unit is just outside the northern boundary.

San Luis National Wildlife Refuge Complex

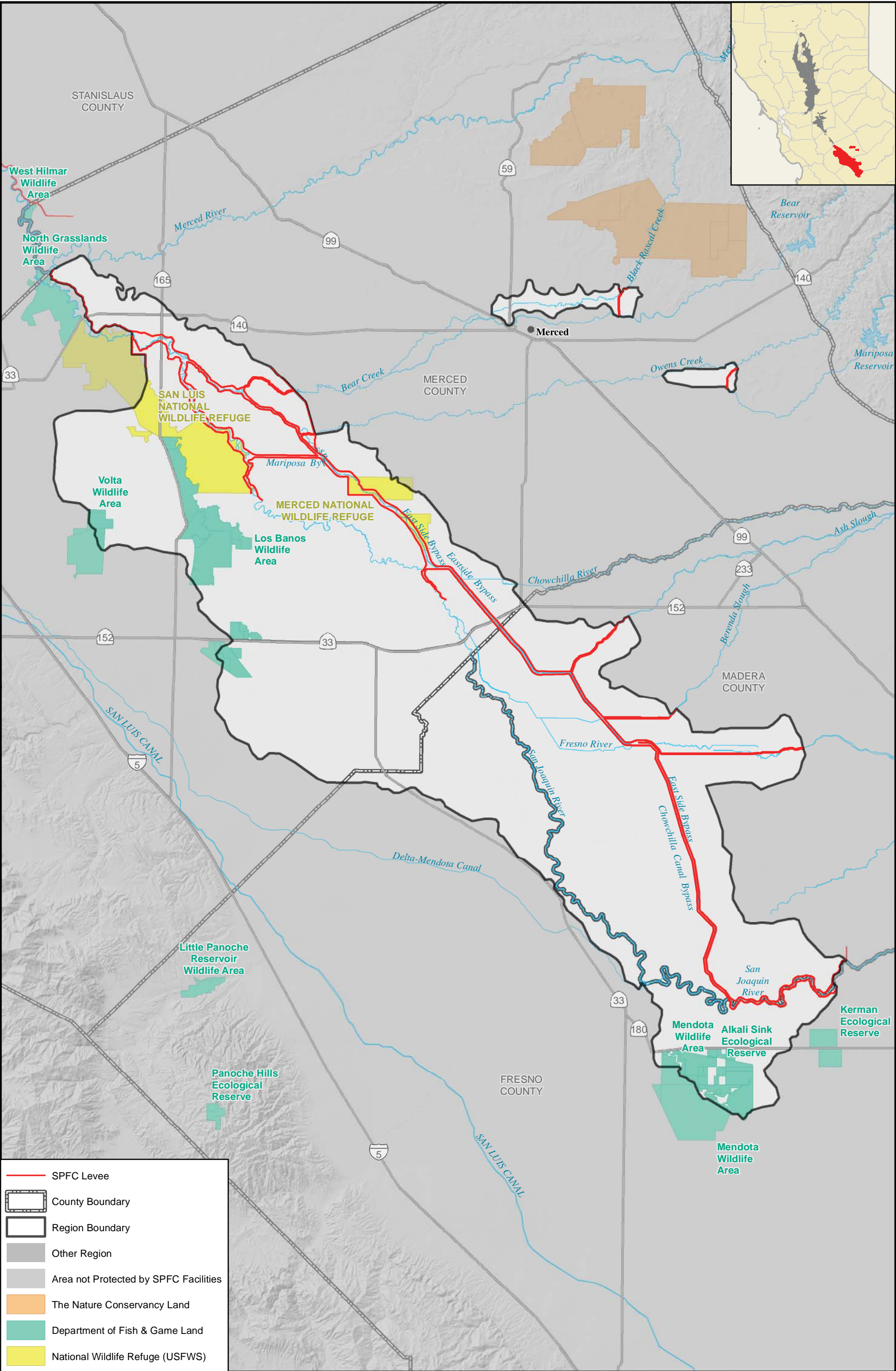
The San Luis National Wildlife Refuge Complex encompasses nearly 45,000 acres of wetlands, grasslands and riparian habitats, as well as over 90,000 acres of conservation easements on private lands for the protection and benefit of wildlife. The complex is composed of the San Luis National Wildlife Refuge, the Merced National Wildlife Refuge, the San Joaquin River National Wildlife Refuge, and the North Grasslands Wildlife Area. The San Luis and Merced National Wildlife Refuges and the North Grasslands Wildlife area are located within the Upper San Joaquin River regional boundary. The extensive wetlands of the Complex and surrounding lands provide habitat for up to a million waterfowl that arrive here each winter. Of the 30 species of waterfowl using the Complex, the most common include Ross’ geese, Aleutian cackling geese, snow geese, green-winged teal, mallard, northern pintail, gadwall, American wigeon, northern shoveler, and white-fronted geese.

Volta Wildlife Area

The Department of Fish and Wildlife’s Volta Wildlife Area encompasses 2,891 acres of managed marsh and valley alkali shrub. This wildlife area provides habitat for beaver, coyotes, cottontails and 150 species of birds including large numbers of waterfowl and shorebirds.



The Mendota Wildlife Area is one of many wildlife areas within the Upper San Joaquin River Region



1" = 5 miles

0 1 2 4 Miles

Datum: NAD 83 Projection: CA (Teale) Albers
Zone: N/A Units: meters
Sources: See Appendix for source citations

Regional Flood Management Planning

Upper San Joaquin River
Managed Environmental Lands

DRAFT

FloodSAFE
CALIFORNIA

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

Prepared By: K. Miller
Date: May 10, 2013
File: Z:\Projects\109146\Map18_EnvLands.mxd

MAP 18

Map 19 – Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species

Riparian Vegetation

Riparian vegetation is a habitat type that is characterized by trees, other vegetation and physical features normally found on the stream banks and flood plains associated with streams, lakes, or other bodies of water. Riparian systems provide several important functions to both the aquatic and terrestrial ecosystems associated with them. These include, but are not limited to, stream bank stabilization, flow moderation and flood control, sediment control, organic matter necessary to support aquatic communities, water quality improvement by filtration, temperature moderation by shading, and stream structural diversity. Riparian habitats support a great diversity of wildlife, including sensitive invertebrates, amphibians, reptiles, birds, and mammals.

Designated Critical Habitat

Designated Critical habitat is a term defined in the Endangered Species Act and used by US Fish and Wildlife Service and the National Marine Fisheries Service. Designated Critical Habitat is a geographic area that is essential for the conservation and recovery of a federally threatened or endangered species that requires special management and protection. It may include

an area that is not currently occupied by the species but that will be needed for its recovery. Critical habitats are designated to ensure that actions authorized by federal agencies will not destroy or adversely modify critical habitat, thereby protecting areas necessary for the conservation of the species. Not all federally listed species have designated critical habitat.

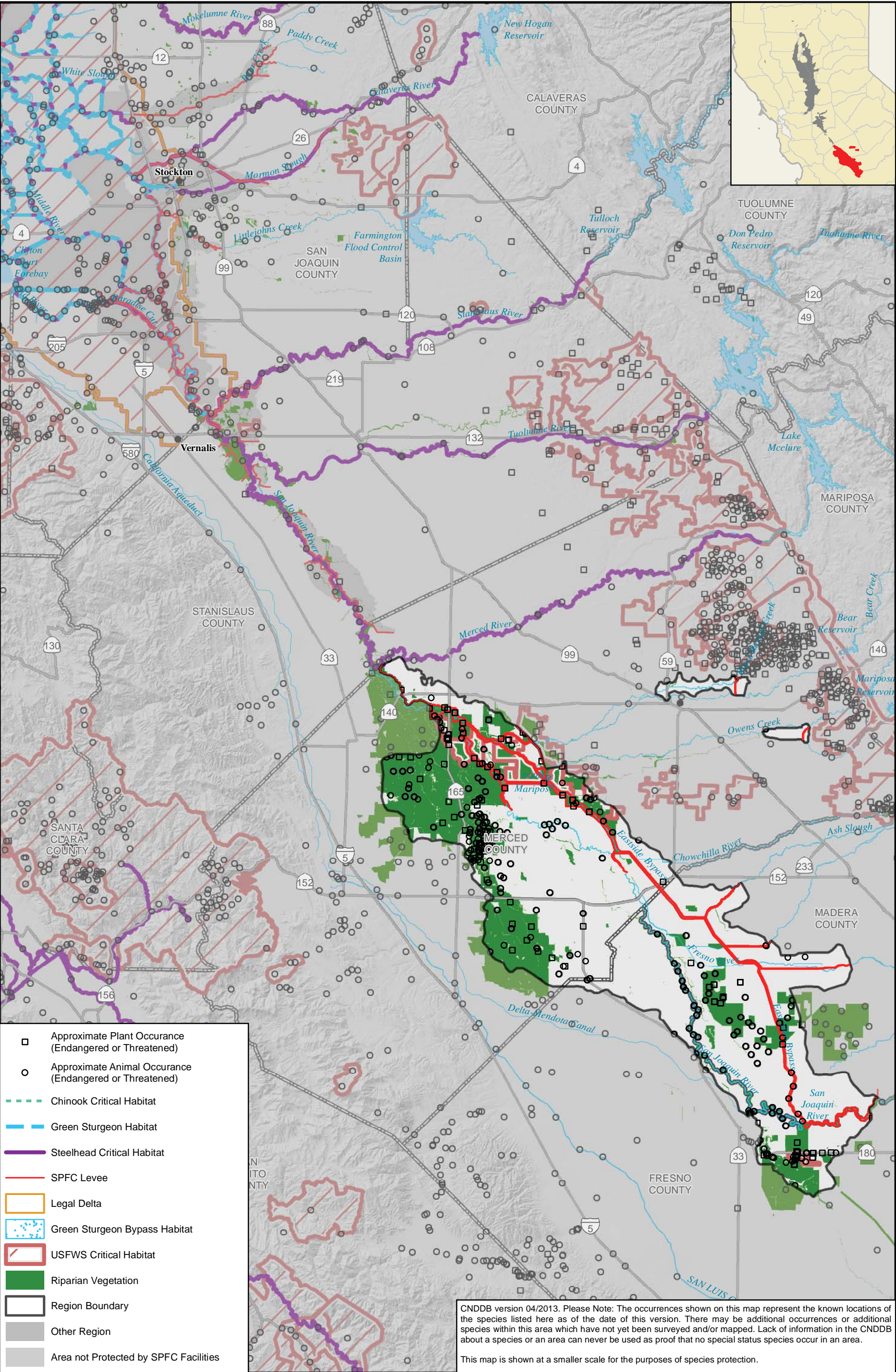
Endangered and Threatened Species

Critical habitat within the Upper San Joaquin River Region occurs primarily in the northern portion of the plan area, and is designated for special-status plant and animal species endemic to vernal pools, swales and ephemeral drainages. The animal species with designated critical habitat in this region include: vernal pool tadpole shrimp (*Lepidurus packardii*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Conservancy fairy shrimp (*Branchinecta conservatio*). Plant species with designated critical habitat in this region are: Hoover’s spurge (*Chamaesyce hooveri*) and Colusa grass (*Neostapfia colusana*). In the southern portion of the region critical habitat exists for the Fresno kangaroo rat (*Dipodomys nitratoides exilis*).

Note: Endangered and Threatened species data shown are representative of occurrence areas defined by the California Natural Diversity Database.



Riparian vegetation along the San Joaquin River



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Glossary

100-year flood event	The flood having a 1-in-100 (1 percent) chance of being equaled or exceeded in any given year. A structure located within a special flood hazard area shown on a National Flood Insurance Program map has a 26% chance of suffering flood damage during the term of a 30 year mortgage. <i>Federal Emergency Management Agency, http://www.fema.gov/, accessed February 2013</i>
200-year floodplain	An area that has a 1-in-200 (0.5 percent) chance of flooding in any given year, based on hydrological modeling and other engineering criteria accepted by the Department of Water Resources. <i>California Government Code Section 65300.2(a)</i>
conveyance capacity	The maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can carry without exceeding a threshold value such as flood discharge, or without using the freeboard distance from the top of a levee.
designated floodway	Means the channel of a stream and that portion of the adjoining flood plain required to reasonably provide for the construction of a project for passage of the design flood including the lands necessary for construction of project levees.
essential public facilities	Essential public facilities include, but not limited to, hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities. <i>California Government Code Section 65302</i>
flood basin	A bowl-shaped, natural landform that historically or presently receives and retains floodwaters, or an engineered floodwater detention basin, excavated below grade or surrounded by levees.
flood bypass	An engineered wide and shallow channel or confined floodplain, usually flanked by levees, that receives floodwaters to reduce the amount of flow in a river or stream.
flood corridor	A passageway for floodflows, including, but not limited to, bypass systems, channels, levee systems, floodplain easements, culverts, floodwalls, or a combination thereof.
floodway, State-designated	The channel of a stream and that portion of the adjoining floodplain required to reasonably provide for construction of a project for passage of the design flood, including the lands necessary for construction of project levee that are regulated by the Central Valley Flood Protection Board.
freeboard	Vertical distance from the normal water surface to the top of a confining wall.
integrated flood management	An approach to dealing with flood risk that recognizes the inter-connection of flood management actions within broader water resources management and land use planning; the value of co-ordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability. <i>California Department of Water Resources, Draft FloodSAFE Strategic Plan, June 2008</i>
local jurisdiction	Means a city, city and county, or county.
Levee Flood Protection Zone	An area that is protected, as determined by the Central Valley Flood Protection Board or the Department of Water Resources, by a levee that is part of the facilities of the State Plan of Flood Control, as defined under Section 5096.805 of the Public Resources Code. <i>California Government Code Section 65300.2(b)</i>
maintaining agency	Maintaining agency means any city, county, district or other political subdivision of the State that is authorized to maintain levees. The California Department of Water Resources maintains levees pursuant to California Water Code Sections 8361 and 12878, but is not considered a maintaining agency.
non-project levee	Any levee that is not part of the State Plan of Flood Control (CWC 9602(c)) or other State-federal or local-federal flood protection facilities. Nonproject levees are typically privately owned or under the authority of a local levee district. ¹
non-SPFC levee	Any levee that is not part of the State Plan of Flood Control (CWC 9602(c)). This includes State-federal levees outside the Sacramento and San Joaquin river watersheds and levees within the Sacramento and San Joaquin river watersheds that do not have documented State assurances of nonfederal cooperation to the federal government or State responsibility identified in CWC Section 8361.
project levee	Any levee that is a facility of the State Plan of Flood Control. ¹ <i>California Water Code 9602 (c) California Water Code 9602 (c)</i>
riparian area	Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. Riparian areas include portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines.

rural community	A city, town, or settlement outside of urban and urbanizing areas with an expected population of less than 10,000 within the next 10 years.
Sacramento-San Joaquin Drainage (SSJD) District	Comprises more than 1.9 million acres in the Central Valley generally along and adjacent to the Sacramento and San Joaquin rivers. SSJD District was created in 1913 by the California Legislature to allow survey work and the collection of data of the San Joaquin and Sacramento rivers and tributaries to prepare a report to the Central Valley Flood Protection Board to further the Board’s plans for controlling the floodwaters of the rivers, improve and preserve navigation, and the reclamation and protection of the lands that are susceptible to overflow from those rivers and their tributaries. The District’s management and control is vested in the Central Valley Flood Protection Board, and according to the Statute, the District can “acquire, own, hold, use, and enjoy any and all properties necessary for the purposes of the District.” <i>Central Valley Flood Protection Board, http://www.cvfpb.ca.gov/, accessed June 2009</i>
Sacramento-San Joaquin River Flood Management System	The Sacramento-San Joaquin River Flood Management System comprises all of the following: (a) The facilities of the State Plan of Flood Control as that plan may be amended by the Central Valley Flood Protection Board; (b) Any existing dam, levee, or other flood management facility that is not part of the State Plan of Flood Control if the board determines, upon recommendation of the department, that the facility does one or more of the following: (1) Provides significant systemwide benefits for managing flood risks within the Sacramento-San Joaquin Valley. (2) Includes project levees that protect a contiguous urban area of 10,000 or more residents within the Sacramento- San Joaquin Valley. <i>California Water Code Sections 9602 and 9611</i>
small community	Developed area with a population of less than 10,000.
State Plan of Flood Control	Means the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project Described in Section 8350 of the California Water Code (CWC), and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section 12648) of Chapter 2 of Part 6 of Division 6 for which the Board or the Department has provided the assurances of nonfederal cooperation to the United States, and those facilities identified in CWC Section 8361. <i>California Water Code Section 9110 (f)</i>
State Plan of Flood Control Descriptive Document	The State Plan of Flood Control Descriptive Document is an inventory and description of the flood control projects and works (facilities), lands, programs, plans, conditions, and modes of operations and maintenance for the State-federal flood protection system in the Sacramento River and San Joaquin River watersheds and facilities identified in WC Section 8361. The document fulfills part of the legislative requirement expressed in CWC Section 9120 (a) and (b).
State Plan of Flood Control Planning Area	The State Plan of Flood Control (SPFC) Planning Area is the geographic area that includes the lands currently receiving flood damage reduction benefits from the SPFC. The SPFC Planning Area is completely contained within the Systemwide Planning Area.
urban area²	A developed area in which there are 10,000 residents or more. <i>California Government Code Section 65007 (j)</i>
urbanizing area	A developed area or an area outside a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years. <i>California Government Code Section 65007 (k)</i>
urban levee design criteria	Urban Levee Design Criteria (ULDC) means the levee and flood-wall design criteria developed by the California Department of Water Resources for providing the urban level of flood protection. <i>California Government Code Section 65007(k) and Water Code Section 9602(i)</i>
urban level of flood protection	Level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the Department of Water Resources. <i>California Government Code Section 65007(l) and Water Code Section 9602(i)</i>

¹Disclaimer: It is important for the reader to understand that a broader definition is often used to describe a project levee as any levee that has been implemented as part of a Federal project. For use with respect to the CVFPP, “project levee” is as defined in the Water Code.

²“Urban Area” is also defined in the California Public Resources Code Section 5096.805 (k) as “any contiguous area in which more than 10,000 residents are protected by project levees.” For use with respect to the Central Valley Flood Protection Plan, “project levee” is as defined in California Water Code Section 9602(c).



PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY

